



Queensland Government Research and Development Expenditure Report 2013-14

Compiled by the Office of the Queensland Chief Scientist
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This report is based on information supplied by Queensland Government agencies on their research and development expenditure for 2013-14. The Office of the Queensland Chief Scientist would like to thank the staff, both within government and external, for their assistance and continued collaboration in collecting research and development data.

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Page 16: Eliminate Dengue. Page 20: Professor Glenn King, Institute for Molecular Bioscience

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Highlights

- In 2013-14, the **Queensland Government spent \$363 million on R&D** (including leveraged funds). This is a **decrease of 31 per cent from the 2012-13** total of \$524 million.
- **\$185 million (51 per cent)** of this money came directly **from the Queensland Government**. The remaining **\$178 million was leveraged funds**.
- For **every dollar invested by the Queensland Government an additional \$0.96 was secured from other sources**, including the Australian Government, universities and businesses.
- Total spend on **infrastructure decreased by 92 per cent** in 2013-14 to only **\$9.8 million**. This was expected as major infrastructure projects were completed.
- **Queensland Government** spend on current expenditure (projects, people and skills) has remained approximately constant (in dollar terms) over the past 3 years. The spend of **\$179 million was leveraged to a total of \$353 million** in 2013-14. This is compared to \$180 million leveraged to \$409 million in 2012-13, and \$173 million leveraged to \$420 million in 2011-12.
- **The Department of Agriculture, Fisheries and Forestry (DAFF) was the largest funder of R&D, spending \$96 million**. \$62.7 million of this was its own funds and the remaining \$33.3 million was leveraged from external sources.
- Significant investment was directed towards two **Queensland Science and Research Priority areas**:
 - As a result of significant investment in the agriculture sector, **37 per cent of total spend** (\$132.4 million) was aligned to 'Developing and delivering **enhanced production technologies, tools and practices** to help grow productivity, reduce waste and add value to our four pillar sectors'.
 - **22 per cent of total spend** (\$80 million) was aligned to the 'Early detection, treatment, and (ultimately) prevention of **age-related and Queensland dominant diseases** (e.g. skin, tropical)'.

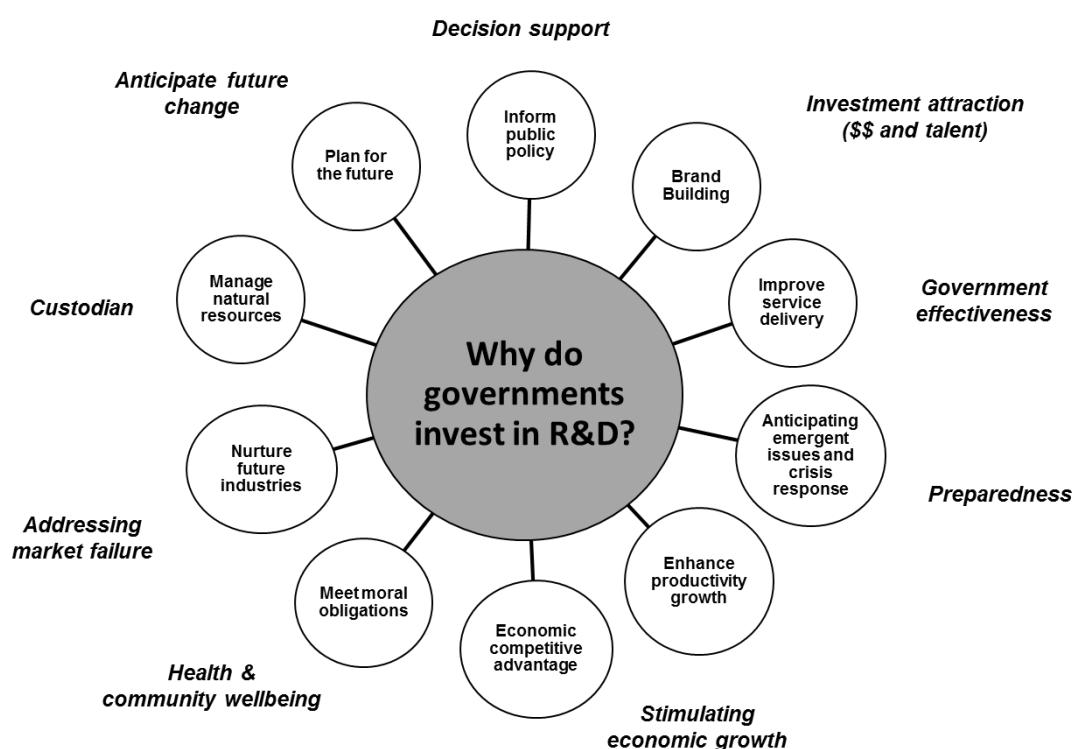
The report

About this document

The Queensland Government's investments in science and research, particularly over the last 15 years, have laid a strong foundation from which we can address future challenges. We have established a global reputation for science excellence and research capability and achieved some outstanding results, for example the development of the Hendra virus vaccine. The importance of maintaining the momentum we have developed is critical.

Since 2004 the Office of the Queensland Chief Scientist (OQCS) has been working with Queensland Government departments to collect detailed information on the money spent by government on research and development (R&D). These reports explore the partnerships and the research priorities that exist across government and assess our investment in R&D.

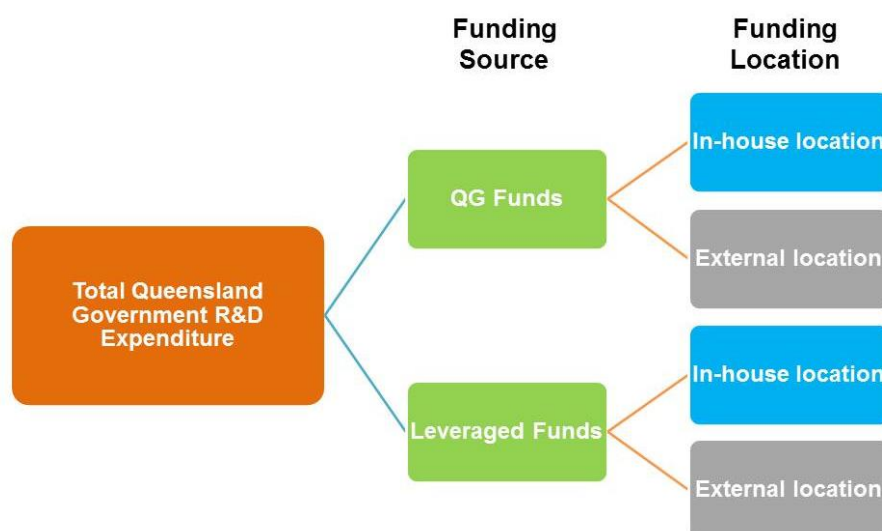
Each Queensland Government department invests in R&D to support and address their respective priorities and develop key capabilities, talent and critical infrastructure. Agriculture, health, the environment, water quality, resources development and education are just some of the research areas the government has invested in over the years. As a result, key capabilities, talent and critical infrastructure have been established. This report details the money spent by Queensland Government departments and agencies in 2013-14.



Scope of the report

The Queensland Government performs and funds a variety of research (Appendix A shows a number of department research highlights for 2013-14). This report provides information on the Queensland Government's R&D expenditure during 2013-14 (Figure 1), and the additional money leveraged from external sources. All R&D funding has been attributed back to departments that existed at the beginning of 2013-2014 (i.e. July 2013) and those that funded the research, rather than performed it.

Figure 1: Breakdown of R&D expenditure included in the report¹



The report includes an analysis of the:

- level of R&D expenditure reported by Queensland Government agencies, government bodies, and hospital and health services (HHSs)
- breakdown of R&D by the funding source (the organisation that provided the funding, e.g. government department or agency)
- breakdown of R&D by location (the sector which performed the R&D, including universities, business, departments and private non-profit e.g. Mater Medical Research Institute Limited)
- alignment of R&D expenditure with the Queensland Government's science and research priorities
- Australian Bureau of Statistics (ABS) classification system (see Appendix B; Tables 2 and 3).

Data has been collected from all departments, government bodies and statutory authorities, and HHSs that perform R&D.

The Queensland Science and Research Priorities published in January 2014 were used in this report to assess R&D expenditure as they were the relevant priorities for the period under review (Appendix C).

¹Queensland Government R&D expenditure reported here differs from that reported by the Australian Bureau of Statistics (ABS), which refers solely to Queensland Government in-house R&D (funded by the Queensland Government and external sources).

Research and Development definition

In this report R&D is defined in accordance with the *Frascati Manual*² - the internationally recognised standard in this area as determined by the Organisation for Economic Cooperation and Development (OECD):

‘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.’

This includes basic, strategic and applied research and experimental development, along with administration and indirect activities which support R&D and are treated as overheads.

The report does not include:

- science activities such as routine monitoring and data collection
- quality control
- testing and standardisation
- scientific and technical services
- market research
- operations research or statistical analyses
- policy-related studies
- routine computer programming, and
- extension or commercialisation of R&D.

Several Queensland Government departments, such as the Department of Science, Information Technology, Innovation and the Arts (DSITIA), undertake important science-related activities that do not fall within the R&D definition, so are not captured in this report.

Other definitions and categories used

R&D expenditure refers to money expended (excluding GST) in the indicated financial year. It includes **capital expenditure** for R&D facilities, such as the acquisition of land and buildings. **Current expenditure** includes labour costs, project materials, grants for fellowships, administration and other overheads, and the costs of indirect services (for example, library materials).

Leveraged funds refer to cash contributions from external organisations towards R&D projects funded or performed by the Queensland Government. This only includes direct contributions (the expenditure forming part of an R&D contract or agreement). This does not include in-kind support (for example, use of internal databases or staff time not directly attributed to the project). Where the Queensland Government does not hold the financial records for amounts spent by external organisations on a project in 2013-14, leveraged funds are calculated pro rata (based on the overall commitment by organisations to the project and the Queensland Government's expenditure on the project in that year).

²Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development, OECD, Paris, 2002, http://www.oecd-ilibrary.org/science-and-technology/frascati-manual-2002_9789264199040-en.

The definitions used for different R&D sectors (for example, universities and business) in this report align with those used by the ABS. This year we have identified government bodies and statutory authorities that perform R&D.

Queensland Government R&D funding refers to money provided from departmental budgets. **Total Queensland Government R&D expenditure** includes both Queensland Government funding and leveraged funds.

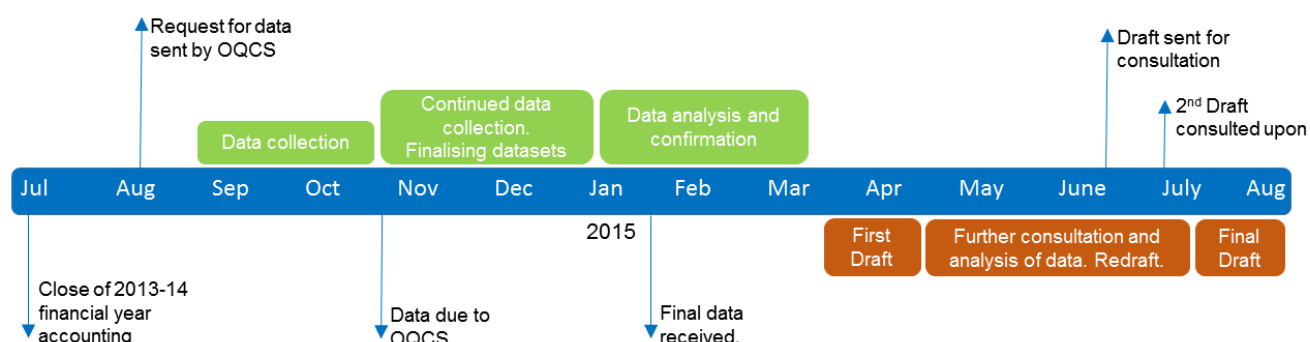
Data collection and Analysis

In August 2014 the Office of the Queensland Chief Scientist (OQCS) began collection of the 2013-14 expenditure data from Queensland Government departments (see timeline below). In addition, all HHSs were asked to provide expenditure data. Queensland Government bodies, authorities and commissions that perform R&D were also included.

Data was not collected from government-owned corporations³, which for R&D reporting purposes are considered a business and are therefore captured as business expenditure on R&D.

Collection and finalisation of data is an extensive process that requires R&D liaisons to liaise within their own department, collect and finalise a whole-of-department dataset. Once sent to OQCS for inclusion, a process to confirm and finalise the dataset begins. OQCS wishes to thank all R&D liaisons for their assistance throughout this lengthy process.

Timeline for the 2013-14 Queensland Government R&D Expenditure Report



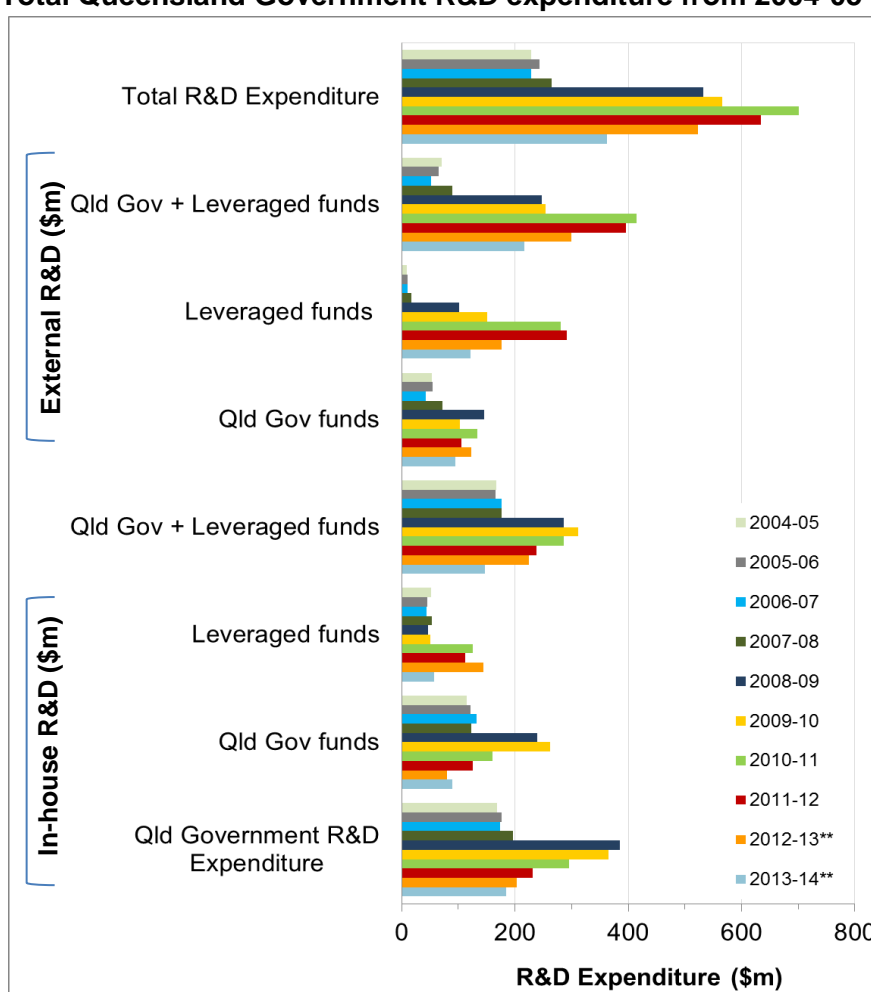
³ E.g. CS Energy Ltd, Energex Ltd, Gladstone Ports Corporation Limited and Queensland Rail Limited.

1. Our historical spend on R&D

Since 1998, the Queensland Government has invested more than \$5.5 billion on scientific infrastructure, projects and skills, and has leveraged an additional \$4.2 billion from various sources (e.g. the Australian Government, universities and philanthropic donors). This has resulted in an overall investment of more than \$9.7 billion (including the 2013-14 R&D expenditure data)⁴.

Since 2010-11 the total Queensland Government investment in R&D has been in decline (Figure 2). In three years our R&D investment has decreased by almost half from \$701 million in 2010-11 to \$363 million in 2013-14 (including both Queensland Government and leveraged funds). The largest decrease has occurred to in-house research funding.

Figure 2: Total Queensland Government R&D expenditure from 2004-05 to 2013-14*



*Total R&D Expenditure = Qld Government + Leveraged Funds, In-House + External (\$m)

This is the second consecutive year in which this report has captured data from government bodies and statutory authorities. Despite the inclusion of additional funding bodies in 2012-13 and 2013-14, there has been a \$160 million decrease in research funding for 2013-14. In fact, total funding for R&D has reduced from \$523 million in 2012-13 to \$363 million in 2013-14 (Table 1).

⁴ Audit of Science Investment and Funding Programs (Innovation and Science Development) Final Report, DSITIA, 2012, <http://www.chiefscientist.qld.gov.au/images/documents/chiefscientist/reports/isd-investment-funding-audit.pdf>

The most significant decrease has occurred in the Queensland Government research locations, known as in-house research, which obtains funding from the Queensland Government and external sources (Table 1). Agencies such as DSITIA, DAFF, the Department of Natural Resources and Mines (DNRM), the Department of Environment and Heritage Protection (DEHP) and the Queensland Museum all performed and funded their own research programs that aligned with their respective research agendas. As in-house research can often cover areas with less visible/direct benefits it is often the first to be cut.

Investment in research performed in-house has declined from \$224 million in 2012-13 to \$147 million in 2013-14 (a decrease of \$77 million). This is the lowest recorded value for in-house funding since 2004-05. Of this \$147 million, 61 per cent (\$90 million) was obtained from the Queensland Government while the other 39 per cent (\$57 million) was leveraged from external organisations and used to fund in-house research.

Just as there was a decrease in total R&D funds in 2013-14, there was also a reduction in funds for research performed externally with a 28 per cent decrease in funds used for external research from the previous year (\$299 million in 2012-13 to \$216 million in 2013-14).

Case Study

The Smart State Story

Research funding under Smart State strategies provided the impetus for collecting R&D expenditure data in this report and its predecessors. Data collection commenced in 2004-05 following the establishment of the Office of the Queensland Chief Scientist.

In 1998, the Queensland Government initiated the Smart State strategy, which broadly covered areas such as creative industries, engineering and nanotechnology. Running until 2011, it was the Queensland Government's signature policy to create a state where knowledge, creativity and innovation were key drivers to economic growth to improve prosperity and quality of life for Queenslanders. It worked towards a vision that knowledge-based industries would account for 50 per cent of all business activity across Queensland by 2025.

Between 1998 and 2011 the Queensland Government invested approximately \$4.9 billion under the 'Smart State' banner, of which⁵:

- \$2.7 billion of this funding went to support in-house Queensland Government R&D, \$1.9 billion went to external organisations, mainly to support major infrastructure projects, and a further \$0.33 billion to deliver Smart State education reforms.*
- 24 per cent of this was used for buildings (infrastructure), 68 per cent funded projects, and 8 per cent went to education and skills programs.*

These investments leveraged a further \$3.3 billion to give a total investment of approximately \$8.2 billion which delivered 45 new research institutes and supported 230 fellowships and scholarships.

⁵ Audit of Science Investment and Funding Programs (Innovation and Science Development) Final Report, DSITIA, 2012, <http://www.chiefscientist.qld.gov.au/images/documents/chiefscientist/reports/isd-investment-funding-audit.pdf>

Table 1: Total Queensland Government R&D expenditure from 2004-05 to 2013-14 across in-house and external locations

| Qld Government R&D Expenditure (\$m) | In-house R&D (\$m) | | | External R&D (\$m) | | | Total R&D Expenditure (\$m) (In-house + External Funds) |
|--------------------------------------|----------------------|------------------|----------------------------------|----------------------|------------------|----------------------------------|--|
| | Qld Government Funds | Leveraged Funds | Qld Government + Leveraged Funds | Qld Government Funds | Leveraged Funds | Qld Government + Leveraged Funds | |
| 2013-14** | | | | | | | |
| 185 | 90 (49%)* | 57 (\$0.63)‡ | 147 | 95 (51%)* | 121 (\$1.27)‡ | 216 | 363 |
| 2012-13** | | | | | | | |
| 203 | 80 (39%)* | 144 (\$1.80)‡ | 224 | 123 (61%)* | 176 (\$1.43)‡ | 299 | 523 |
| 2011-12 | | | | | | | |
| 231 | 126 (54%)* | 112 (\$0.89)‡ | 237 | 105 (46%)* | 291 (\$2.76)‡ | 396 | 634 |
| 2010-11 | | | | | | | |
| 295 | 161 (54%)* | 125 (\$0.78)‡ | 286 | 134 (46%)* | 281 (\$2.09)‡ | 415 | 701 |
| 2009-10 | | | | | | | |
| 365 | 262 (72%)* | 50 (\$0.19)‡ | 312 | 103 (28%)* | 151 (\$1.48)‡ | 254 | 566 |
| 2008-09 | | | | | | | |
| 385 | 239 (62%)* | 47 (\$0.19)‡ | 286 | 146 (38%)* | 101 (\$0.69)‡ | 247 | 533 |
| 2007-08 | | | | | | | |
| 196 | 123 (63%)* | 53 (\$0.43)‡ | 176 | 72 (37%)* | 17 (\$0.23)‡ | 89 | 265 |
| 2006-07 | | | | | | | |
| 174 | 132 (76%)* | 44 (\$0.33)‡ | 176 | 42 (24%)* | 10 (\$0.25)‡ | 52 | 228 |
| 2005-06 | | | | | | | |
| 176 | 121 (69%)* | 45 (\$0.37)‡ | 166 | 55 (31%)* | 10 (\$0.18)‡ | 65 | 243 |
| 2004-05 | | | | | | | |
| 168 | 115 (68%)* | 52 (\$0.45)‡ | 167 | 53 (32%)* | 9 (\$0.18)‡ | 70 | 229 |

(Note: Numbers have been rounded, resulting in individual amounts not always adding up to totals)

**2012-13 and 2013-14 data includes government bodies and statutory authorities that perform R&D

*Percentage of Queensland Government expenditure

‡Leveraging rate

2. Queensland Government funding and leveraged funds

Many sources of funding exist for R&D but they can be separated into two major sources: 'Queensland Government' and 'Leveraged'. Queensland Government funding is government money spent by departments and leveraged funds are those obtained from external sources such as universities, the Australian Government, philanthropic donors and businesses.

In 2013-14, the Queensland Government spent \$185 million on R&D (that is Queensland Government money that went to both research performed in-house and externally). This is 9 per cent lower than the previous year (Figure 3a). While the level of investment has remained relatively steady for the last four years, it is the smallest investment by the Queensland Government since 2007-08 and is much smaller than the high of \$385 million in 2008-09.

Figure 3a: Total R&D expenditure (current and capital) by funding source, 2003-04 to 2013-14 (CPI adjusted)

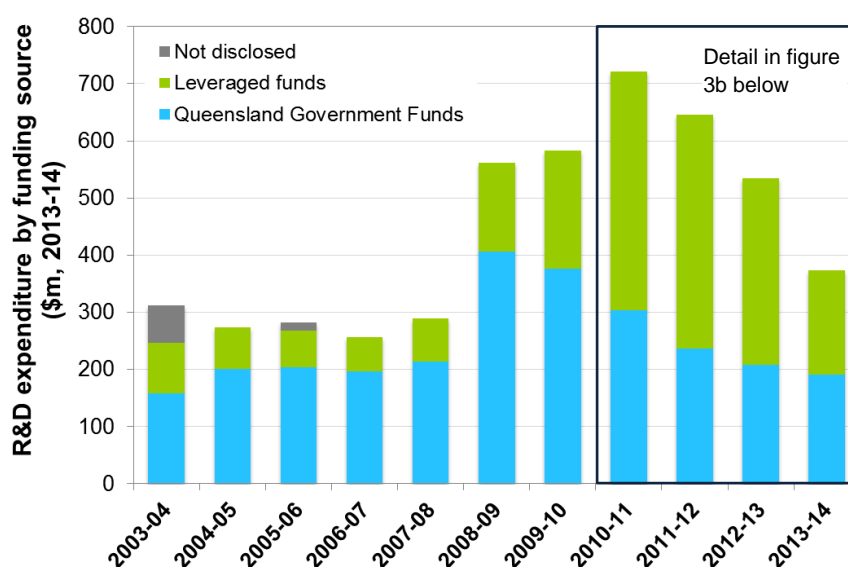
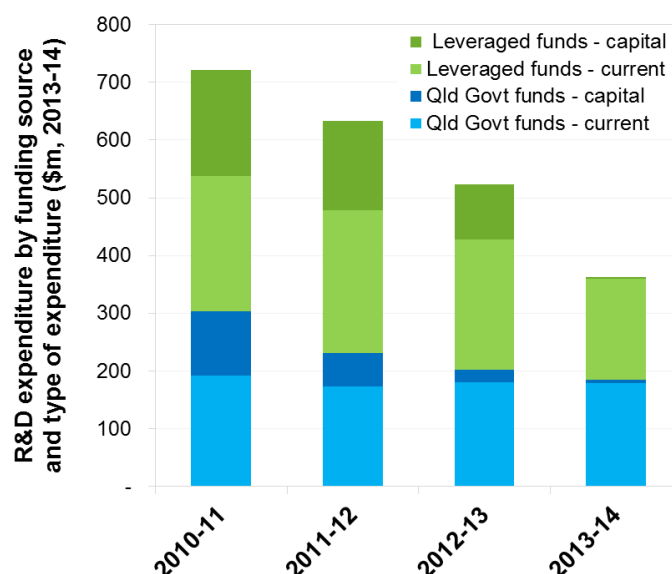


Figure 3b: Total R&D expenditure by funding source and type of expenditure, 2010-11 to 2013-14 (CPI adjusted)



Note: Capital and current expenditure data matched to funding source has only been collected since 2010-11.

But Queensland Government spend is only half the picture. In 2013-14 an additional \$178 million was leveraged from various sources (Figure 3a and 3b). This equates to an additional \$0.96 for every dollar the Queensland government invested in R&D. Collaboration and partnerships are essential to R&D success and are the key to translating research outcomes into new products and discoveries. Leverage is not only about money though, as it brings partners to the table and increases stakeholder commitment in the short and long term. It also helps build 'soft infrastructure' and encourages the investment of alternative resources.

Leveraged funds have decreased for both current and capital expenditure in 2013-14. Leveraged funds spent on capital are 96 per cent less in 2013-14 going from \$94.8 million in 2012-13 to \$3.5 million (Figure 3b). This is a direct result of strategic choices made by the Queensland Government to focus on people, projects and skills. Our total capital spend has decreased 92 per cent from \$117.3 million in 2012-13 to \$9.8 million in 2013-14 (Figure 4). The remaining commitments towards capital investment are primarily held by DSITIA in establishing the Australian Institute of Tropical Health and Medicine at James Cook University until 2015-16, and to the Queensland Centre for Advanced Materials Processing and Manufacturing. DSITIA was the major funder of capital in 2013-14.

Figure 4: Total expenditure on capital (infrastructure)*, 2009-10 to 2013-14



*Detailed capital investment records have been captured since 2010-11 (although capital spend was collected as a total figure in 2009-10).

Smart State strategies invested significantly in capital and expenditure in this area has declined as various major infrastructure projects have completed (prior to Smart State ending in 2011). For example significant capital projects included the Translational Research Institute, the Ecosciences Precinct, the Health and Food Sciences Precinct and QIMR Berghofer Medical Research Institute (QIMR). This planned decrease in infrastructure spend is as a result of the significant commitment made in previous Smart State strategies to develop infrastructure. In the Smart State III program the focus explicitly shifted from large scale investment on infrastructure to an investment in research talent.

*'In the last 10 years we've contributed to the development of 36 new research institutes, many of which involve brand new buildings, and while we'll still be investing in that infrastructure, we are going to be moving the investment from bricks to brains.'*⁶

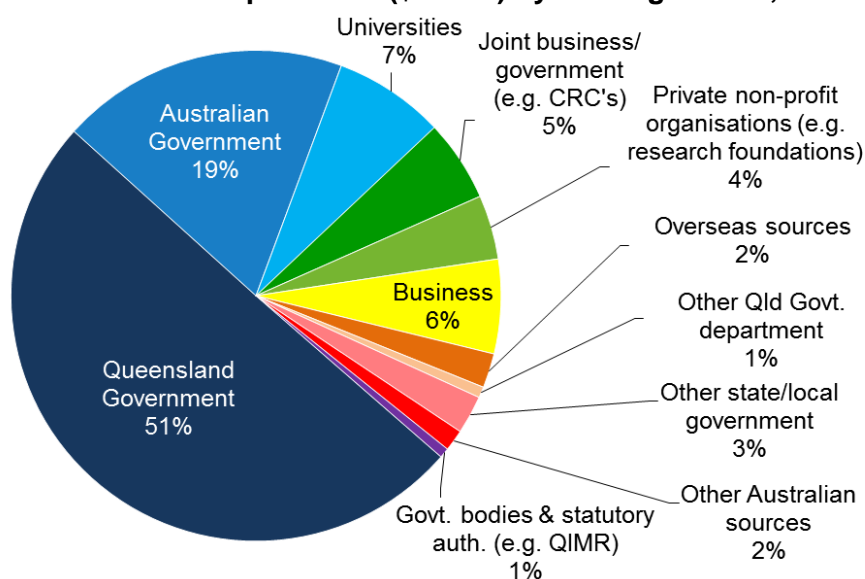
⁶ BIO 2008: Bananabenders go from bricks to brains. 2008. (<http://www.lifescientist.com.au/content/biotechnology/news/bio-2-8-bananabenders-go-from-bricks-to-brains-894704883>).

2.1 Other funding sources

Queensland Government departments provided just over half the funding for R&D in 2013-14 (51 per cent, \$185 million) with the remaining 49 per cent coming from various sources external to the government (Figure 5). The largest external funding source is the Australian Government which provided 19 per cent of funds (\$68.8 million), followed by universities (7 per cent, \$26.5 million). It is encouraging to see that business sources have provided 6 per cent of external funding (compared to 3 per cent in previous year) (Figure 5).

Again in 2013-14, as it was in 2012-13, QIMR received the most Australian Government funding (\$27 million). In comparison to 2012-13, this represents almost half the amount sourced from the Australian Government, however it remains a substantial leverage amount.

Figure 5: Total R&D expenditure (\$363 m) by funding source, 2013-14



The Australian Research Council continues to be a good source of leverage, supporting various programs and grants with additional support provided through Queensland Government departments. The Department of Education, Training and Employment supports the Cooperative Research Centre (CRC) for Living with Autism Spectrum Disorders (see the case study for further information), and the Science of Learning Research Centre. The centre has 25 chief investigators across eight research organisations supported by nine partner organisations including three state education departments. In addition, the Department of Communities, Child Safety and Disability Services provides funding support to the ARC Centre of Excellence for Children and Families over the Life Course.

Case Study

Centre for Living with Autism Spectrum Disorders (Autism CRC)

Founded in 2013, the Brisbane-based Cooperative Research Centre for Living with Autism Spectrum Disorders (Autism CRC) is the world's first national, cooperative research effort focused on autism.

Autism is among the most complex, prevalent and heritable of all neurodevelopmental conditions, affecting at least 1 in 100 people. It is a lifelong condition with estimated annual support costs to Australia alone potentially exceeding \$7 billion.

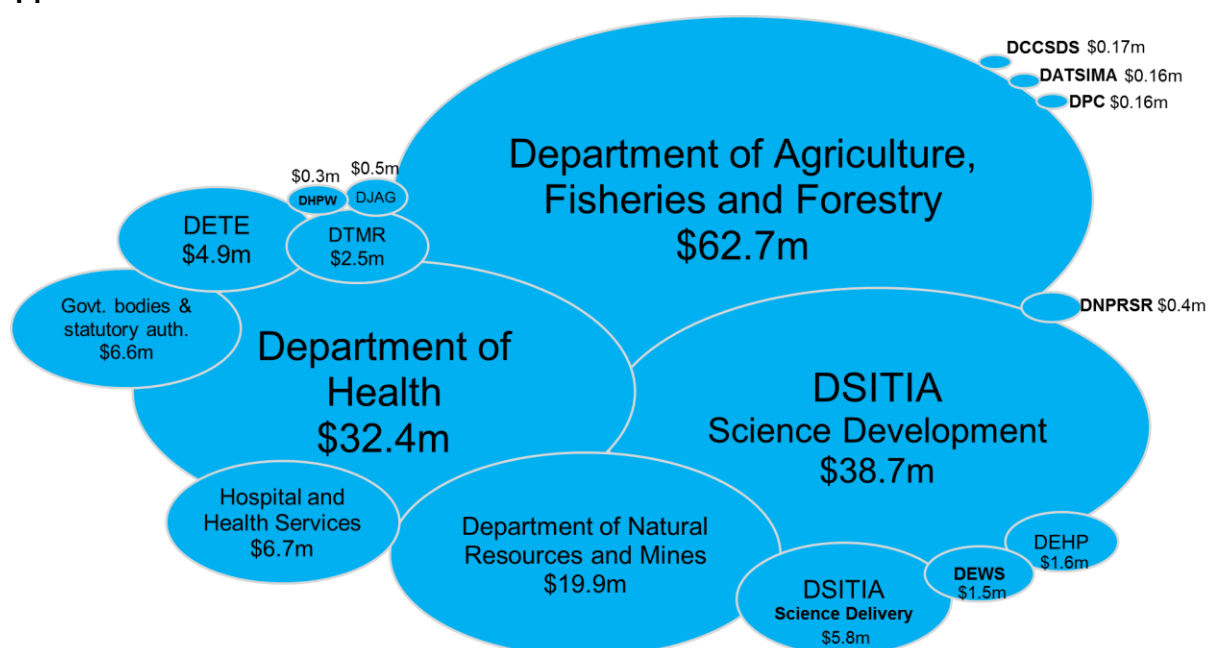
Autism CRC brings together researchers, industry, and health and education service providers on a scale not seen before, with people who have experience living with autism at the centre of our activities. Autism CRC has developed the world's first 'Inclusive Research Practices' for autism where organisations and individuals across Australia and overseas are collaborating through Autism CRC towards the common goal of improving outcomes for people with autism across the lifespan.

As a Federal Government Cooperative Research Centre it is funded by a \$31 million Australian Government grant, as well as a mix of university and industry funding. In 2013-14, the Queensland Government Department of Education, Training and Employment contributed \$40,000 as part of a \$340,000 commitment. Seven universities across Australia have also contributed \$350,000, including our own Griffith University, Queensland University of Technology (QUT) and the University of Queensland, with an additional \$3.9 million contributed by the Australian Government through the CRC program.

2.2 Department investment in R&D

From the total R&D spend of \$363 million in 2013-14, just over half was obtained from the Queensland Government (\$185 million). Departments utilise Queensland Government money to perform and invest in R&D. They also utilise this money to leverage further funds from external agencies. In 2013-14, the majority of Queensland Government expenditure was by DAFF (34 per cent, \$62.7 million) which is broadly consistent with the previous year (28 per cent, \$57 million in 2012-13). As seen in Figure 6, DAFF spent almost twice as much on its variety of program areas as any other department, including the Science Development area of DSITIA and the Department of Health. DSITIA's Science Development group spent \$38.7 million (21%) which is a decrease on the previous year (\$29.3 million, 43 per cent). This is again due to the reduced spend on capital infrastructure and is a consistent trend over the last few years, reflecting the end of major infrastructure projects. (For detailed information on departmental R&D expenditure, see Appendix E).

Figure 6: Queensland Government monies expended by departments on R&D for 2013-14^a



Key:

DATSIMA - Department of Aboriginal and Torres Strait Islander and Multicultural Affairs
DCCSDS - Department of Communities, Child Safety and Disability Services
DETE - Department of Education, Training and Employment
DEWS - Department of Energy and Water Supply
DEHP - Department of Environment and Heritage Protection
DHPW - Department of Housing and Public Works
DJAG - Department of Justice and Attorney General
DNPRSR - Department of National Parks, Recreation, Sport and Racing
DSITIA - Department of Science, Information Technology, Innovation and the Arts
DPC - Department of the Premier and Cabinet

Govt. bodies & statutory auth. - Government Bodies and Statutory Authorities (e.g. QIMR)

*R&D expenditure was attributed to the Queensland Government agency funding the R&D. In some instances, this differed from the department reporting the R&D expenditure. As such, values here may differ from the values reported by individual Queensland Government agencies to the OQCS.

¹Data for the Metro North HHS was not provided for 2013-14 so 2012-13 data was substituted in its place. The following HHSs provided a nil return: Cairns and Hinterland HHS, Central Queensland HHS, Central West HHS, North West HHS, South West HHS, Torres and Cape York HHS, Townsville HHS and Wide Bay HHS.

^aUpdated data from DTMR provided post analysis indicated that department spend was \$5.5 million rather than \$2.5 million

The Department of Health (DH) increased their spending to \$32.4 million in 2013-14 compared to \$28 million in 2012-13. In addition to the department spend, the HHSs which are responsible for the day-to-day running of the public hospitals, spent an additional \$6.7 million of Queensland Government funds in 2013-14.

The fourth largest spend on R&D was by the Department of Natural Resources and Mines (DNRM) which almost doubled its investment in 2013-14 (\$19.9 million) compared to the previous year (\$10 million). R&D spend by other Queensland Government departments has remained stable and is comparable to previous years' spend by the departments.

R&D is not always central to an agency's strategy and function, and levels of investment differ across agencies. For example, in 2013-14 DAFF's total income was \$414.5 million and they spent \$62.7 million on R&D (not including leverage), which equates to 15 per cent of their

budget. This is in line with the department's strategic direction to '*work to develop efficient, innovative, resilient and profitable agriculture, fisheries and forestry industries that thrive for the long-term*'. In 2012-13, the ABS estimated that 35 per cent of Australian agriculture, forestry and fishing businesses are engaged in innovation⁷. Queensland figures are not available from the ABS, however the *Queensland Business Innovation Survey 2014 Report* found that 58 per cent of agriculture, forestry and fishing businesses in Queensland reported innovation activity in the three-year period preceding December 2013. In 2013-14 DAFF showed that 60 per cent of their research, development and extension service clients reported implementing new or improved practices, processes, systems, products and technologies after engaging with frontline activities.

In comparison, DETE's core service delivery role is education and training. In 2013-14 DETE had an annual budget of \$13.4 billion and its spend on R&D was \$4.9 million. This equates to 0.04 per cent of its total budget and reflects the fact that R&D is not central to its function. It may also be worth noting that this spend does not capture the considerable support that DETE provides to university R&D more generally, particularly through its approval of applications to conduct research in schools.

3. In-house and external R&D

The Queensland Government performs R&D (this is defined as 'in-house'). It also partners with external organisations to perform research and funds research through grants, fellowships and infrastructure investments. In addition, the Queensland Government supports R&D performed by external agencies and institutes and commissions research to inform public policy or provide expertise in a field not able to be covered by in-house researchers. If research is not performed within Queensland Government premises, it is termed 'external R&D'.

Since 2009-10 there has been a steady reduction in the total funds spent on in-house research. The \$147 million spend for 2013-14 was a 34 per cent decrease from the previous year's spend of \$224 million (see Table 1). Of this in-house funding, the majority came from the Queensland Government (61 per cent, \$90 million) and the remaining \$57 million (39 per cent) was leveraged funding.

There were three locations that perform the majority of research for the Queensland Government (Figure 7). The following list shows the percentage of research performed by each of these locations:

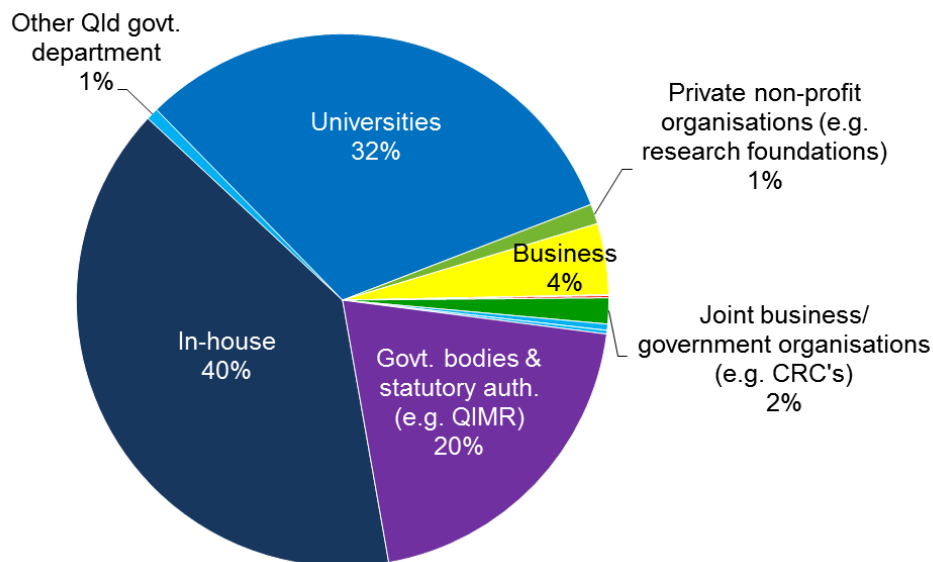
1. 40 per cent of total research was performed in-house by Queensland Government departments (compared to 43 per cent in 2012-13)
2. 32 per cent of total research was performed by Queensland universities
3. 20 per cent of research was performed by government bodies and statutory authorities.

This is not unexpected as these entities are closely associated with various Queensland Government departments and have strongly aligned research agendas. Collection of data from the government bodies and statutory authorities that perform R&D was initiated in the 2012-13 report. As this collection continues it will be interesting to see if this pattern continues.

⁷ ABS 81660: Summary of IT Use and Innovation in Australian Business, 2012–13.

This is also the first year this data has been directly incorporated into the expenditure collection.

Figure 7: Total R&D expenditure (\$363 million) by location that performed the research, 2013-14



A total of \$216 million (60 per cent) was spent on externally located research, the majority being with the university sector and government bodies and statutory authorities. Of the remaining externally located spend, (7 per cent, \$28.6 million), \$15.7 million has gone to research performed within the business sector. The majority of this funding is provided by DAFF. DSITIA also supports external research in the form of funding for the Queensland node of the Commonwealth Research Data Storage Infrastructure and National eResearch Collaborative Tools and Resources Projects (which provide critical infrastructure for very large scale research data and computer cloud resources to Queensland research). Of this external spend, 56 per cent (\$121 million) is obtained from leveraged funds and 44 per cent (\$95 million) was provided by the Queensland Government.

In 2013-14, for every \$1 the Queensland Government spends on both in-house and external research we received \$0.96. For every \$1 we spent on in-house research we gained an additional \$0.63, while external research attracted \$1.27 for every \$1 spent. It is obvious that research performed externally gives a better dollar value in return, but the research performed in-house fulfils various important roles, including maximal alignment with government priorities, clearly addressing government specific issues, and addressing public good research needs.

There will always be 'public good' research that the government will need to perform. We also know that our capital spend is where the biggest leverage capacity comes from, and with this decreasing and our focus shifting to soft infrastructure, we may continue to see a shift in the amount of money we can continue to leverage.

Case Study

Innovative Dengue Prevention Technologies for the Asia-Pacific Region project - funded by DSITIA and the Department of Health

Dengue is ranked by the World Health Organization as the most serious mosquito-borne viral disease in the world. Outbreaks occur regularly in North Queensland, with 192 locally-acquired cases between October 2013 and June 2014. The Queensland Government has been supporting vital research in this area with the Department of Health providing grant funding of over \$1 million across three years to support the 'Eliminate dengue research program'. The Australian collaboration between James Cook University, the University of Melbourne and Monash University has additional funding from the Australian and Queensland Governments, the Wellcome Trust and the Foundation for the National Institutes of Health through the Grand Challenges in the Global Health Initiative of the Bill & Melinda Gates Foundation.

In 2010 additional funds of \$1.9 million were provided through the Smart Futures Funds to the 'Innovative Dengue Prevention Technologies for the Asia-Pacific Region project' - to reduce the ability of dengue carrying mosquitoes to spread the disease. This project contributed to the broader Eliminate Dengue program which at the time was led by Professor Scott O'Neill at The University of Queensland. Professor O'Neill and the Program have since transferred to Monash University.

The team's work has shown that introducing Wolbachia (a bacteria commonly found in insects) into the dengue-carrying mosquito stopped it from being able to transmit the virus. With the support of Queensland residents and government, the team has been releasing Wolbachia mosquitoes in communities where dengue has previously occurred, including suburbs in and around Cairns and Townsville. When released, Wolbachia mosquitoes breed with wild mosquitoes and pass Wolbachia to their offspring through the eggs, greatly reducing the risk of local transmission of dengue. Further trials are underway in countries where dengue is endemic, including Indonesia, Colombia, Vietnam and Brazil, however the Australian trials are the most advanced and showing very positive results.

As a sustainable, long-term approach, it is believed the Wolbachia method has the ability to greatly reduce the global burden of dengue. The method has the potential to be used on other insect transmitted diseases, such as yellow fever and malaria, and benefit millions of people around the world.



Wolbachia cannot be passed to people from mosquitoes when they bite

4. What is the focus of our R&D?

4.1 Our Science and Research Priorities

In October 2013, the Queensland Chief Scientist released the Queensland Science and Research Priorities, an overarching framework to guide Queensland Government R&D investments to help ensure any future investments provide value for money and are well aligned with Queensland Government objectives. The priorities are focused on well-defined areas, use our competitive advantages, and reflect identified needs and activities the government considers important. The priorities are seen as a 'living document' and updated versions are published periodically.

In March 2015 the Queensland Chief Scientist reviewed the Queensland Science and Research Priorities. The Revised Queensland Science and Research Priorities published in June 2015 have included services innovation and the role of science and technology therein and are published in Appendix C.

The priorities used in this report and listed below were the prevailing priorities during 2013-14.

Queensland Science and Research Priorities

- Developing and delivering **enhanced production technologies, tools and practices** to help grow productivity, reduce waste and add value to our four pillar sectors: **resources** (including energy and mining), **construction, tourism, and agriculture** (including food).
- Remain internationally competitive by **attracting and retaining science and research talent**. This will be done through early-career researcher support programs in priority areas and by **encouraging research-focussed mobility and effective translation** between industry, academia and government.
- **Protecting our biodiversity** and heritage: marine and terrestrial.
- Natural advantage **clean(er) - and renewable - energy technologies** development (e.g. gas, solar, biofuels).
- Ensuring the **sustainability of our physical** and especially our **digital infrastructure** critical for research and - correspondingly - strategically leveraging national programs (including making use of 'big data').
- **Building resilience and managing climate risk**, through the design and development of construction technologies for extreme weather event resistance (floods, cyclones, droughts), **particularly in tropical environments**.
- Early detection, treatment, and (ultimately) prevention of **age-related and Queensland dominant diseases** (e.g. skin, tropical).
- Improving **health** data management and **services delivery** (including telemedicine).
- Ensuring **sustainable water use** and delivering **quality/water security** in a variable climate and in a resources-intensive economy.
- **Digitally-enabled technologies**, e.g. the development and application of advanced modelling, visualisation, sensing and simulation technologies, tools and practices, including robotics.

The priorities listed above were used, for the first time, to classify spending in 2013-14. In cases, where an R&D project is relevant to two or more priorities, its expenditure is apportioned between the relevant objectives so that the proportion of funds invested in each priority could be estimated (Figure 8). In 2013-14, there was a very strong investment (37 per cent of total R&D expenditure) in the priority '*Developing and delivering enhanced production*

technologies, tools and practices to help grow productivity, reduce waste and add value to our four pillar sectors'. This investment was targeted to the agricultural area.

There was also a very strong investment in the 'Early detection, treatment, and (ultimately) prevention of age-related and Queensland dominant diseases (e.g. skin, tropical), with \$80 million spent (22 per cent of the total spend). Given this priority covers areas such as skin cancer (of which Queensland has the highest rate in the world), age-related diseases (including Alzheimer's) and Queensland dominant diseases (e.g. malaria and dengue fever), it is highly important that this priority is well supported by Queensland research.

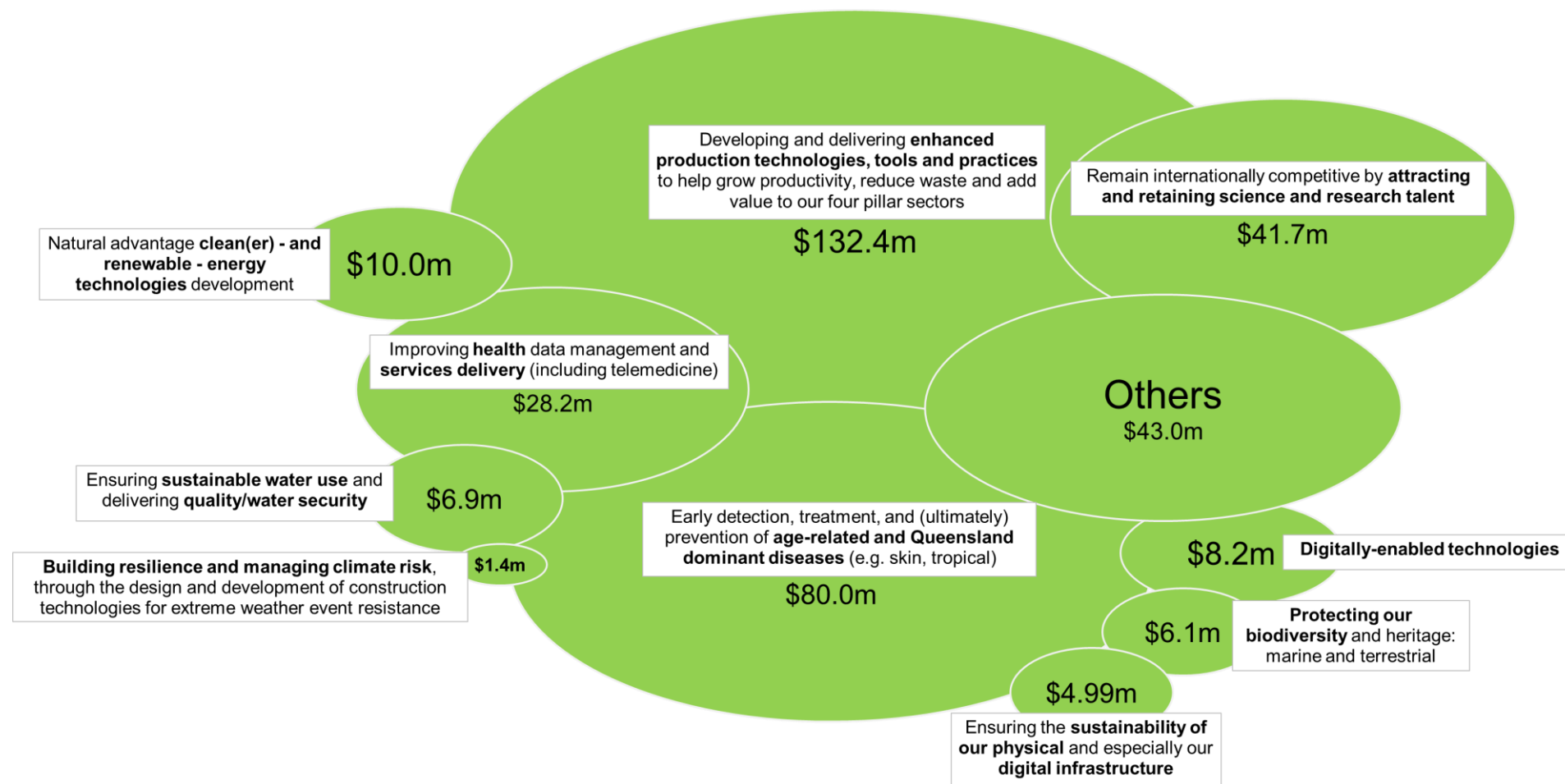
There is still strong support for our research base in Queensland as evidenced by the priority titled 'Remain internationally competitive by attracting and retaining science and research talent'. In 2013-14, 11.5 per cent (\$41.7 million) of total spend went towards this priority. This includes substantial investment through clinical research fellowships, the Science of Learning Research Centre funded through DETE, and Queensland Museum grants that support researchers.

The 'Improving health data management and services delivery (including telemedicine)' priority attracted the fourth largest investment (not including the 'others' group) with 7.8 per cent of the total spend (\$28.2 million). Queensland is leading the way in health services delivery research, particularly when the National Health and Medical Research Council allocates only 4 per cent of funding for health services research (half the Queensland value spent in this area). In 2012, only 26 health services research applications were funded out of 731.

The priorities exist to guide investment and identify research areas that align closely with Queensland Government objectives. DSITIA is the primary user of the priorities as it guides investment in science and research funding which they administer, however departments also have their own priorities that they wish to address. In 2013-14, \$43 million (11.8 per cent) of funding was allocated outside of the science and research priorities. For example, funding provided by the Motor Accident Insurance Commission (MAIC) and QUT for the Centre for Accident Research and Road Safety Queensland (CARRS-Q). Additionally, the Department of Communities, Child Safety and Disability Services supports the Australian Housing and Urban Research Institute (AHURI) which performs research on housing and urban issues. These are only two examples of research that is central to Queensland Government objectives, but outside of the priorities.

As this is the first year research has been classified according to the Queensland Science and Research Priorities it will be interesting to see how research aligns to the priorities in 2014-15.

Figure 8: Total R&D expenditure (\$363 million) classified according to the 2013-14 prevailing Queensland Science and Research Priorities



Case Study

Spider venom may have legs as future painkiller

Researchers from the Institute for Molecular Bioscience (IMB) at The University of Queensland may have found a new painkiller using spider venom, typically used by spiders to immobilise or kill their prey.

After several years of research during which 205 spiders were tested, a team at IMB led by Professor Glenn King, isolated seven peptides - the building blocks of proteins - in spider venom that blocked the molecular pathway responsible for sending pain signals from the nerves to the brain. One peptide in particular, from a Borneo orange-fringed tarantula, had the right structure and stability to potentially become a potent painkiller.



Professor Glenn King

Long-term chronic pain affects about 15-20 per cent of the population, and up to 50-65 percent of the elderly. Traditional painkillers and medications can be addictive, and abuse of these drugs has soared in recent years. This new painkiller won't be addictive, will not wane in its effectiveness and will have limited side effects.

Diabetic neuropathy, cancer treatments and osteoarthritis are the areas the researchers are targeting. Very specific pain relief trials will continue on rats for two to three years and a commercial product could be used in five years.

The study conducted at IMB was supported by funding from the Australian Research Council, the National Health and Medical Research Council, and the National Institute of Neurological Disorders and Stroke of the National Institutes of Health. The Australian research has also attracted funding from Janssen Pharmaceuticals Inc., a unit of Johnson & Johnson, and the Queensland Government. The Queensland Government have underpinned this and many other developments through a grant of \$10 million per annum over ten years (2004-2014) to the IMB at UQ.

4.2 Focus areas

In order to compare the 2013-14 research spend with previous years, use of the ABS classifications for Socio-economic Objectives (SEO) and the Fields of Research (FOR) have been used in this report, as they were in the 2012-13 report. Further explanation of the classifications can be found in Appendix B, in Table 2 and Table 3. In essence, the SEO classification breaks research down into 'the outcome areas' while FOR indicates the 'technical areas used to perform the research'. An explanation of the two codes is below:

Socio-Economic Objective (SEO)

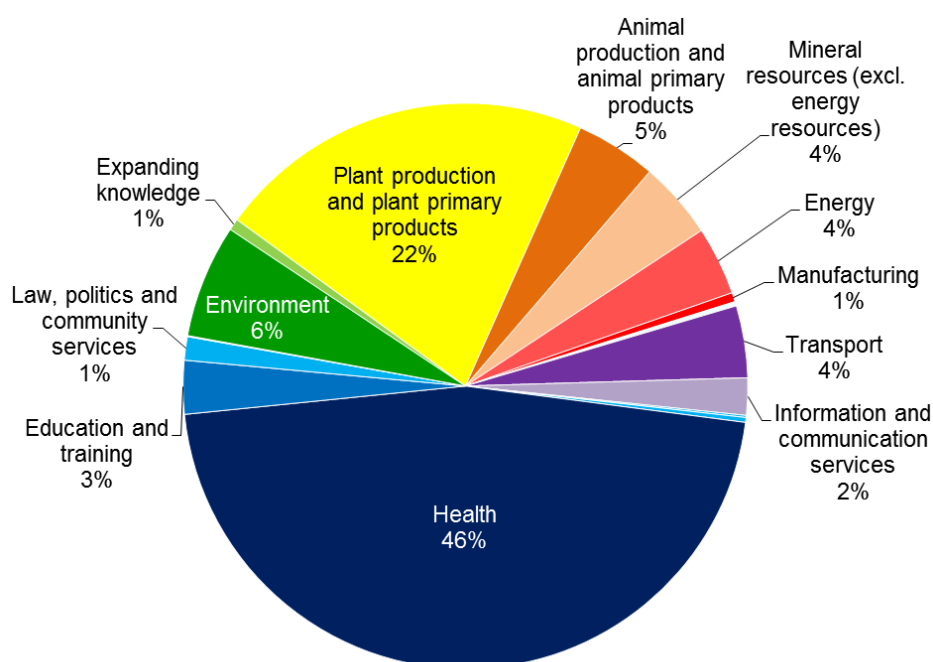
The SEO classification allows R&D activity to be categorised according to the intended purpose or outcome of the research rather than the processes or techniques used in order to achieve this objective. For example, a project developing information technology systems engineering for telemedicine would be aligned with the Health SEO as it provides health outcomes.

Fields of Research (FOR)

The FOR classification allows R&D activity to be categorised according to the field of research and the methodology used in the R&D. For example, a project developing an artificial material for use in joint replacements would be aligned with *engineering* as it utilises engineering-based techniques, rather than the *health* outcome it would provide for. It is important to note that direct comparison between the two classification systems is not possible.

By using the SEO code we get an indication of the areas in which the research outcomes will be delivered. The Science and Research Priorities indicate that *health* is a key area of research and it is the second largest spend with two health priorities totalling \$108.2 million. Using the ABS codes *health* outcomes have the largest spend at 46 per cent (\$168 million), for both the SEO and FOR classifications (Figures 9 and 10). This difference seen between the priorities classification and the ABS classification is caused by the reassigning of R&D into more defined groups. For example, research aligned to the priority titled '*enhance production technologies, tools and practices*' in the four pillar sectors is separated into more than one code. With the SEO chart this priority is distributed amongst the '*plant production and plant primary products*', '*animal production and animal primary products*', '*environment*', '*mineral resources (excluding energy resources)*' and '*construction*' and '*energy*' objectives.

Figure 9: Total R&D expenditure by socio-economic objective for 2013-14, classified by intended outcome of the research



The second largest spend is in the *plant production and plant primary products* area. This is primarily due to the large number of projects led or funded by DAFF, but also includes projects funded or performed by DSITIA's Science Development and Science Delivery groups. The remainder of research funding is spread across several research areas including: *animal production and animal primary products* (\$16.8 million), *environment* (\$23.5 million), *transport* (\$14.9 million), *energy* (\$14.2 million), *mineral resources* (\$16 million) and *education and training* (\$11.1 million).

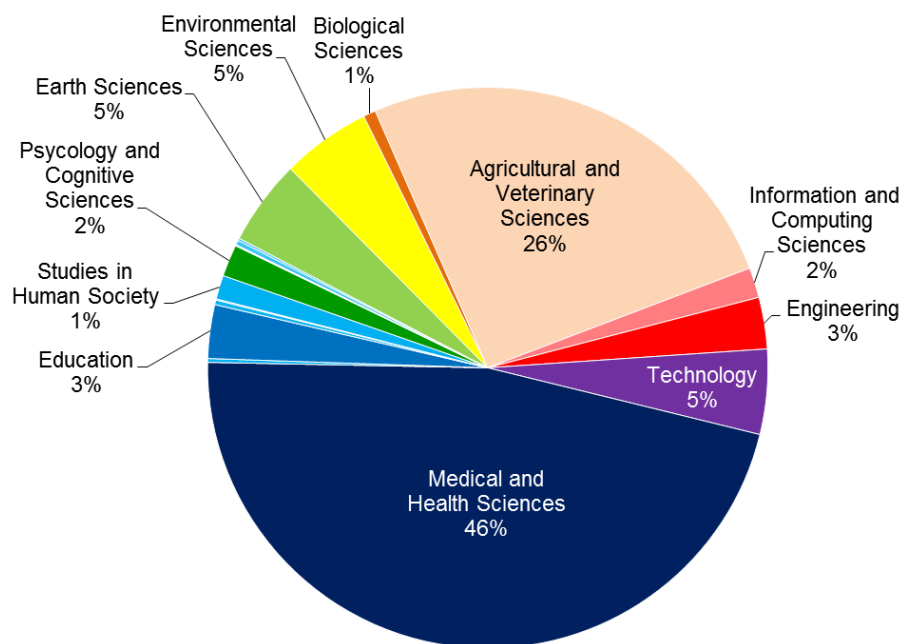
In terms of FOR classification, we see the same level of investment in the health classification - *medical and health sciences* - with 46 per cent of total expenditure, compared to 50 per cent in 2012-13 (although it is worth noting that 2012-13 data was used for the Metro North HHS) (Figure 10).

The second and only other notably large spend is in the *agricultural and veterinary sciences* (26 per cent, \$93.5 million) (also reflected in the SEO outcomes). The remaining spend is distributed across several research areas with *environmental sciences* (5 per cent or \$18.7 million), *technology* (5 per cent or \$17.8 million), and *earth sciences* (5 per cent or \$17.8 million) representing the largest spends.

The education and training spend doubled in 2013-14 with 3 per cent of total R&D investment (compared to 1.6 per cent in 2012-13). This is due to the collaborative investment being made by DETE and other organisations to both the Cooperative Research Centre for Living with Autism Spectrum Disorders and the Science of Learning Research Centre.

It is evident from Figures 9 and 10 that the majority of our investment in R&D occurs in the agricultural space and the medical and health areas.

Figure 10: Total R&D expenditure by field of research for 2013-14, classified by perspectives or techniques used to perform the research.



5. Findings and recommendations

The government invests in R&D to benefit all Queenslanders, to improve the economy and preserve the environment. The years of investment in R&D have greatly benefited our infrastructure, researchers and knowledge base.

Finding One

Total funding for R&D (including both current and capital expenditure) has decreased in 2013-14 to \$363 million. In 2010-11 total expenditure was at an all-time high of \$701 million due to significant infrastructure commitments. The reduction in 2013-14 is primarily caused by previous infrastructure commitments drawing to a close. Of the \$701 million spent in 2010-11, almost \$300 million was spent on capital investments and \$406 million on current expenditure. In comparison, in 2013-14 capital expenditure was just under \$10 million and the remaining \$353 million was spent on current expenditure showing that although capital spend had been reduced, the commitment to fund people, projects, and skills has remained relatively unchanged.

For every \$1 the government spent on R&D we gained \$0.97. Additionally, in-house research is the primary focus of total spend, receiving 40 per cent of research dollars. This is well supported by the university sector (at 32 percent) and by government bodies and statutory authorities that perform R&D.

Recommendation:

There has been a deliberate shift from 'bricks to brains to business' over the last few years. As infrastructure commitments reach completion there has been a corresponding decline in leveraged funding. The government is continuously aware of the value of leveraging and will seek to maximise opportunities to build on investments and attract co-investment through the recently announced Advance Queensland initiative. It is recommended that Queensland Government efforts increase opportunities to collaborate and gain additional partners in projects (noting that this may not always include leveraging additional funding).

DAFF is one department that already performs well in terms of leveraging additional funding and has created many strong collaborations. In 2013-14, 35 per cent of that department's funding was derived from external sources. To build on this successful model the design of the recently announced Advance Queensland initiative should stipulate a matched funding requirement for grant recipients. This will encourage greater commitment from external sources who will need to put 'skin in the game'. This will provide an opportunity for skills development, job creation and strong university/government/industry collaborations to develop and foster.

Finding Two

In 2013-14 there was a 94 per cent decrease in the amount of money spent on infrastructure (from \$117.3 million in 2012-13 to \$9.8 million in 2013-14) as anticipated and planned for. Since 1998 the Queensland Government has invested \$863 million in science infrastructure and this investment has funded 45 research infrastructure developments. There has been a deliberate shift in research spend from this physical infrastructure to people, projects and skills

which was first planned for through Smart State III⁸ (i.e. 'Bricks to Brains') and continued with successive strategies such as the Accelerate funding operational at the time of this R&D expenditure data collection and also strategically planned for in the Advance Queensland initiative.

Recommendation:

The move away from infrastructure is a strategic decision at this time. The Queensland Government is focussed on the pathway of 'Bricks to Brains to Business' - and the creation of new jobs now and in the future. As new technological developments occur, and as our focus changes requiring new investment areas (e.g. imaging technologies, robotics developments, etc) the projects, people and skills invested in will be crucial in delivering new developments, and translating these developments into commercial outcomes (the 'brains to business' end).

Due to the above outlined expenditure in physical infrastructure the Queensland Government is unlikely to invest significantly in new buildings and should explore innovative and novel ways to attract co-investment in existing government funded infrastructure and its application. It is important that we optimise the use of infrastructure we have already invested in and developed. A good example of this is the joint collaborative research agreement between Queensland University of Technology's Institute of Health and Biomedical Innovation and the QIMR Berghofer Medical Research Institute which enables QUT access to specialist health and medical laboratories and facilities at the QIMR Berghofer building.

Finding Three

DAFF is the largest provider of R&D funding within the Queensland Government with 34 per cent of the Queensland Government spend (also evidenced in 2012-13). In fact, DAFF invested almost twice as much funding as any other department. Leverage opportunities are also utilised well by DAFF as 35 per cent of their funding in 2013-14 was derived from external sources.

This is not an unexpected result as DAFF directly supports UQ's Queensland Alliance for Agriculture and Food Innovation (QAAFI). QAAFI incorporated three centres – the Centre for Plant Science, the Centre for Animal Science, and the Centre for Nutrition and Food Science. In addition funding is provided to Sugar Research Australia. These entities utilise DAFF funding and leverage additional funding from external sources such as the Australian Government and other research and development corporations.

Recommendation:

The findings above are in line with expectations and are a good outcome for a department that has R&D as a core activity and it is hoped that this will continue. Continued alignment of DAFF's R&D activity with the Queensland Science and Research Priorities and the Federal Government's Strategic Research Priorities for Australia will provide DAFF with greater opportunity to expand their R&D portfolio. DAFF should continue to develop further opportunities to leverage external funds. The models, such as QAAFI, underpinning this ability to leverage external funding should be sought after (where able) by other departments to increase their capacity to optimise research outcomes and leverage further funding.

⁸ Bligh launches new Smart State strategy. 2008. Premier Media Statement. <http://statements.qld.gov.au/Statement/Id/58148>

Finding Four

The level of R&D expenditure reported by the Department of Health and the HHSs was similar to that provided in 2012-13. Whilst some HHSs reported a nil expenditure this may be a reflection of the data capture processes rather than a lack of R&D being undertaken. The lack of a core agency may translate to the absence of a single vision and to varied policies around research priorities for Health. In addition, the smaller HHSs may lack funding and opportunity to properly support R&D within their areas primarily due to their remoteness and the decentralisation of core activities.

Recommendations were made in the *Assessment of health and biomedical science in Queensland* published by QQCS⁹ in 2014 which have potential to strengthen the health and medical research landscape funded and performed by the Queensland Government. These recommendations are being reinforced here as they are pertinent to the medical and health expenditure that occurs annually by the Queensland Government.

The assessment identified that the:

‘scope of health research, both Australia-wide and internationally, provides a great opportunity for the State to integrate its research and clinical strengths in focussed projects to reduce health care costs and develop value-added innovative new therapeutics, vaccines, diagnostics and clinical practice. However to take full advantage of these opportunities, focussed support for translational research - where it is of benefit to Queensland - is needed, both financially and culturally’

Recommendation:

Whilst recognising that the HHSs are statutory bodies, the Department of Health should support the HHSs to deliver on the objectives set out in their respective research investment strategies, whilst ensuring that funding provided for R&D supports key department priorities and provides mechanisms to maximise collaboration and to leverage further returns.

An overarching strategy by the Department of Health detailing clear roles and responsibilities would provide assurance on the expenditure being delivered in this core area and integrity of data as data collection would occur through a core agency. A key R&D strategy would also ensure alignment of R&D funding to priority areas and provide a way to maximise collaboration and to leverage further returns.

Firstly and primarily, support for health and medical research should be the responsibility of the Department of Health - and funded through mechanisms quarantined from overall hospital and health services' budgets.

Secondly, the Department of Health should conduct a detailed audit of all funding for health and medical research (including the clinical fellowships program) and identify gaps and priority areas where R&D funds could be directed.

And thirdly, the Department of Health should work with the CEOs of the HHSs to develop strong, measurable key performance indicators that demonstrate a commitment to research, including the collection and sharing of R&D data.

⁹ Assessment of health and biomedical science in Queensland. 2014.
(<http://www.chiefscientist.qld.gov.au/images/documents/chiefscientist/reports/assessment-health-biomedical-science-qld-2014.pdf>)

Finding Five

Departmental annual reports contain good examples of research highlights that deliver benefit for Queenslanders and show the good work departments are funding and that our researchers are doing (Appendix A). However there are disparities between R&D expenditure data, including projects submitted to QQCS, and the research highlighted in the department annual reports.

Recommendation:

Queensland Government staff and collaborators perform research that fulfils a public need as well as answering vital questions. It is recommended that there should be complete compatibility between the projects and funding details listed in the annual reports and the expenditure collection. This raises the concern that communication of Queensland Government research is also not being effectively achieved and should be a priority going forward.

In future collections QQCS will utilise sources such as annual reports and service delivery statements to compliment the collection of department R&D expenditure, in addition to the data collected directly from departments. This will assist in providing a more complete picture on the money spent by departments and its impact.

It is also essential that Queensland Government departments communicate the good research funded and performed by its staff and collaborators if the community is to see the impact and reach that this good research base can and does have. It is essential that all departments ensure that entities provided with government funding acknowledge appropriately and routinely the commitment provided by the government in support of their research.

Finding Six

In terms of Queensland Government priorities of 2013-14, Queensland R&D in this report reflects two primary areas of focus - the agricultural sector and the treatment and prevention of age-related and Queensland dominant diseases. This was further confirmed when looking at the socio-economic objectives and the field of research codes where the majority of the R&D spend is in the plant/agricultural space and medical and health areas.

Recommendation:

The science and research priorities are to align R&D performed or funded by Queensland Government departments and also used by DSITIA (now DSITI) for grant funding schemes. It is recommended that the areas listed above remain a focus for Queensland Government funding and should be incorporated in the 'Revised Queensland Science and Research Priorities' being developed by QQCS for the Queensland Government.

In addition, these priorities provide a strong indication of the problems facing Queensland now and in the immediate future. With this in mind departments should be using the priorities developed by the Queensland Chief Scientist, in addition to their own priorities, to target R&D investment and to answer identified needs. When used with the 'R.E.D.S. Decision rules for investment'¹⁰ (see Appendix D) the Queensland Government can ensure that R&D investments are targeted, collaborative and impactful.

¹⁰ Decision rules for investment (R.E.D.S.) 2014. (<http://www.chiefscientist.qld.gov.au/strategy-priorities/decision-rules-for-investment-r-e-d-s>)

Appendices

Appendix A – Department research highlights

Appendix B – Australian Bureau of Statistics classifications

Appendix C – Revised Queensland Science and Research Priorities

Appendix D – Decision Rules for Investment (R.E.D.S.)

Appendix E – Funding tables

Appendix A – Department research highlights

The research highlights listed below are taken from departmental annual reports and are available in further detail at <https://www.qld.gov.au/about/staying-informed/reports-publications/annual-reports/>.

Department of Aboriginal and Torres Strait Islander and Multicultural Affairs

- National Partnership Agreement - The Closing the Gap Clearinghouse was established under the National Partnership Agreement on an Indigenous Clearinghouse. This is a shared commitment between the Australian Government and state and territory governments to build an evidence base which contributes to the achievement of the Closing the Gap targets and objectives set out in the National Indigenous Reform Agreement and the broader Council of Australian Governments' (COAG) Indigenous reform agenda.

Department of Agriculture, Fisheries and Forestry

- Invested \$3 million over four years with the Queensland University of Technology and its industry partner to develop the AgBot (a small on-farm weed management robot) and investigate options for weed and nutrient management.
- Invested \$3.95 million with Sugar Research Australia for the provision of sugarcane research, development and extension (RD&E) to increase productivity and profitability, improve efficiency along the supply chain, maintain environmental sustainability and investigate diversification opportunities in the sugarcane industry.
- Invested \$12.4 million into Beef R&D across the state. An additional \$3.46 million from other collaborator investment boosted this investment.
- In 2013-14 the Queensland Government invested an estimated \$1.369 million in R&D to help sustain the dairy industry through the current seasonal and market difficulties and foster future growth. This R&D is focused on helping the industry deliver the quantities and quality of fresh milk that meets at least 85 per cent of Queensland's market needs throughout the year. The program is conducted in close partnership with the University of Queensland at the new Gatton Dairy Research Facility. This facility is regarded nationally as a Centre of Excellence, providing relevant expertise to all milk production regions across Queensland.
- Commercial harvest of Queen Garnet plum was undertaken at Good Rich Fruit's orchard at Waroo, from late January to late February 2014. Approximately 160 tonnes of fruit were harvested with 80 tonnes being sold to the fresh market (both domestic and export) and 80 tonnes processed by Tropico (Palmwoods, Queensland). The fruit sold on the fresh market attracted a premium price relative to other plum varieties available at the same time. Ongoing work in writing scientific reviews, and undertaking phytochemical analysis, in vitro bioaccessibility and health testing of Queen Garnet products is being undertaken by DAF scientists in collaboration with the University of Queensland, Technical University of Munich, Griffith University, University of Southern Queensland, and University of Wollongong. Promising results from these studies include the potential for Queen Garnet plum juice to improve platelet function and reduce thrombosis risk, as well as reducing the impact of 'western' high fat/high carbohydrate diets by improving heart function and lowering inflammation.

- World-leading innovative research at the Bribie Island Research Centre, conducted in partnership with the Australian government under the National Landcare Program, is using sand worms and sand filter beds to filter and clean the water used in prawn aquaculture ponds. When harvested, sand worms also provide a high-value feed for prawn hatchery broodstock. In 2013-14, fine-tuning research demonstrated the excellent quality and growth rate of prawns grown in association with this filter system. Further work is planned to accelerate the adoption and uptake of this technology.
- Innovative pre-breeding research by the department provided genetic solutions and elite lines of sorghum, mungbeans, maize, chickpeas, barley, wheat and other grains and pulses, with increased tolerances to diseases, pests and drought, together with improved market qualities. Mungbean varieties bred by DAFF (now DAF), including 'Jade-AU', now comprise around 95 per cent of all mungbean crops grown in Australia, and are delivering increased crop profitability, improved soil health, disease rotations and weed control options for industry. In 2013-14, 129 sorghum germplasm lines were also licensed to commercial seed companies with over 3,000 experimental hybrids containing Queensland-bred germplasm currently under evaluation by industry.

Department of Communities, Child Safety and Disability Services

- National Centre of Excellence (NCE) to Reduce Violence against Women and their Children: This is an initiative under the National Plan to Reduce Violence against Women and their Children 2010-2020. Queensland has contributed to the NCE through the departmental funds paid to the Queensland Centre for Domestic and Family Violence Research. Expenditure in 2012-13 was to establish the new National Centre with support funding to continue until 2016.

Department of Education, Training and Employment

- Participation in the Cooperative Research Centre for Living with Autism Spectrum Disorders.
- Participation in the Science of Learning Research Centre.

Department of Energy and Water Supply

- The Queensland Geothermal Energy Centre of Excellence is a ground-breaking initiative made possible through a \$15 million grant to the University of Queensland by the Queensland Government. The Centre's aim is to conduct research that will help establish geothermal energy as an economically feasible and environmentally sensible electricity source for Queensland. The centre will engage in four streams of research, power conversion, heat exchanges, transmission and reservoirs.

Department of Health

- Funding for the QIMR Berghofer Institute of Medical Research established in 1945 under the *Queensland Institute of Medical Research Act 1945* ensures the proper control and management of QIMR Berghofer, which was established for the purposes of conducting research into any branch or branches of medical science.
- Funding for the Queensland Emergency Medicine Research Fund, Cancer Council Queensland Cancer Clinical Trials Data Manager Scheme and the Australian Centre for Health Services Innovation support significant health and medical research programs.
- Funding is provided for health and medical research fellowships (approximately 40 at any one time) including the Health Research Fellowships that provide up to \$150,000 per annum for three years as salary support to allow hospital and health services to back-fill the clinical time of practicing clinicians or other health professionals to undertake clinical or health service research and the Senior Clinical Research Fellowships which provide funding of up to \$850,000 per annum for five years to attract and retain researchers to Queensland who are international leaders in their field.
- Fellowships in nursing and midwifery and physiotherapy are also provided each year in accordance with the Memorandum of Understanding with the Queensland Nursing Council and the Memorandum of Understanding with the Physiotherapy Board of Queensland.
- Funding is provided to the Medical Research Commercialisation Fund and to support the Australian Research Ethics Database that supports all Queensland Health Human Research Ethics Committees, Research Governance Officers and researchers in Queensland.

Department of Housing and Public Works

- Funding for the Australian Housing and Urban Research Institute for research on housing and urban issues.

Department of National Parks, Recreation, Sport and Racing

- The Centre of Excellence for Applied Sport Science Research has contributed to the generation of new information and knowledge and its dissemination in the sport science, sport management and coaching communities. This information is used to improve the performance and training of elite athletes. The Queensland Government contributes \$0.6 million per year to the Centre of Excellence, as well as in-kind support through the Queensland Academy of Sport.

Department of Natural Resources and Mines

- Developed and launched the Queensland Globe - a free online tool that allows users to view and explore more than 250 spatial data sets spatial data using Google Earth. Growth in usage continues to increase, with the one-billionth map request received on 19 June 2014.
- Developed software and hardware to enable online access to large geological and geographical datasets for the minerals and energy resources sector through the Large Spatial Data Online Delivery initiative.
- Over \$1.1 million to support the mining industry with specialised mining safety research, consulting and investigation services including opening a state-of-the-art virtual reality

(VR) mine training facility at the Safety in Mines Testing and Research Station (SIMTARS).

- Research into the environmental and physical impacts of inert gases injected by a GAG Jet into an underground mine to control underground fires and explosions.
- Preservation of historical seismic data, through the scanning of hard copy material into digital format under the Seismic Section Scanning initiative. This project means that this trove of information is now also available on-line for the first time.
- Round 7 of the Collaborative Drilling Grants Initiative was successfully concluded in June 2014. This initiative provides grants of up to \$150,000 to companies undertaking innovative exploration for mineral and energy resources, particularly in frontier areas of the State. Tenders for round 8 were called in April 2014 with contracts subsequently awarded to 16 successful applicants.
- Provision of over \$5.2 million worth of new pre-competitive geophysical data and geological assessments to both attract new exploration investment and support existing exploration activity through the Greenfields 2020 New Mineral Frontiers Initiative.
- Commencement of the first round of the Industry Priorities Initiative under the Future Resources Program which provided funding of \$3 million toward four innovative geoscience projects nominated by industry as research priorities.
- \$5.9 million toward a range of further research projects undertaken by the Geological Survey of Queensland to improve understanding of the geology and geological resources of Queensland.
- Major research projects to protect the Great Barrier Reef including \$4.8 million for a water modelling and monitoring program and a further \$4.24 million under a number of sub-projects under the Paddock to Reef project aimed at improving the quality of water entering the reef lagoon.
- Developed a spatial technology-based system for better management of stock routes through the Stock Route Management System (SRMS).
- Research to assess the impact of coal seam gas extraction on aquifers in the Surat Basin Cumulative Management Area.

Department of Science, Information Technology, Innovation and the Arts

- Supported the Clem Jones Centre for Ageing Dementia Research by committing \$9 million over five years.
- Committed \$42.12 million, and leveraged a further \$42 million from the Australian Government, to build essential infrastructure and bolster key research projects for the Australian Institute of Tropical Health and Medicine in conjunction with James Cook University.
- Continued to build on collaborations and research opportunities under Queensland's science and technology related agreements with China's Ministry of Science and Technology and the Chinese Academy of Sciences.
- Provided \$2.3 million in direct funding for contracted research to evaluate the effectiveness of the rezoning of the Moreton Bay Marine Park that came into effect in 2009. These funds were leveraged to \$6.5M in partnerships with CSIRO, Griffith University, The University of Queensland and the University of the Sunshine Coast.
- Invested over \$0.3 million in research to demonstrate soil carbon increase through rangeland restoration by facilitating native forest regrowth.

- Funding of \$0.5 million was provided for research into using nitrogen fertiliser formulations for sugar cane to reduce nitrous oxide emissions without loss of sugar cane yield. The Emission Factor to be used in the Australian Greenhouse Accounting for sugar cane was affirmed.
- Other key science and research deliverables included the: launch of the Wastewater Tracking and Electronic Reporting System (WaTERS) to receive, store and provide timely reports on water monitoring; developed and released new fire scar mapping products that show a 27 year fire history of Queensland; released land use and land use change mapping for South East Queensland; and commenced storm tide monitoring at four new locations in the Torres Strait and at Burketown to enhance severe weather forecasts and modelling for Far North Queensland.
- Provided \$250,000 to support research into the susceptibility of individuals to tuberculosis and rheumatoid arthritis, as the basis of developing new treatment regimes and vaccines.
- Provided \$1.5 million to help establish a world class Head and Neck Cancer Centre in Queensland where research will be undertaken around the prevention and treatment of head and neck cancers.
- Provided \$650,000 to support the development and delivery of a concept design for an off-grid concentrated solar thermal power plant featuring both thermal storage and hybrid cooling capabilities.
- Provided \$900,000 towards research into the practical application of unmanned aircraft in conditions considered too dangerous for piloted aircrafts, making them better suited to the continuous mapping of floodwaters and fire-fronts, assessing damage to infrastructure and locating disaster survivors.
- Provided \$315,000 towards research that is investigating how electronic services enabled by connectivity to the National Broadband Network can support greater productivity for farming enterprises, as well as providing related support and social services to rural residents.

Department of Transport and Main Roads (TMR)

- Provided funding of \$19 million over four years to 2017-18 for the Australian Roads Research Board Group (ARRB), achievements to date have included:
 - A \$600,000 per annum saving through successfully merging TMR data collection business with ARRB. The savings resulted from the lowering of overhead costs and efficiency gains realised through the use of new automated crack detection technology.
 - Lower costs through reduced asphalt pavement thickness in Queensland. Research has ratified that the Austroads asphalt pavement fatigue models relating to the temperature effects (which drive additional thickness) are not valid for Queensland conditions. Correcting this design model in the coming years will allow TMR to deliver more capital for the same expenditure.
 - Improved pavement asset management decision making through the introduction of the Traffic Speed Deflectometer (TSD). TSD improved decision making by providing state-wide network level pavement strength information annually.
 - Increasing certainty of performance through the use of new technology. The Hamburg Wheel Tracker is being used to test asphalts sensitivity to moisture and reduce stripping defects. The tool will help identify moisture susceptible asphalt mixes and therefore will reduce the number of early asphalt pavement failures.

- In addition to the above, ARRB through collaboration with TMR and subsequently all of its members, has initiated the harmonised national Transport Infrastructure Product Evaluation Scheme (TIPES). TIPES will remove existing entry barriers for new innovative products assessing each product against an established, rigorous criteria. To date the scheme has been adopted by all States and Territories and local governments across Queensland and Western Australia.
- Provided the Smart Transport Research Centre with funding of \$500,000 per annum for three years until 2013. Achievements have include the development of Jellyfish, a model-free transport network coding standard that acts as a middleware between transport data storage and application. Work undertaken within the agreement included real time traveller information research, managed motorways technology research, and the model free network (jellyfish) research.
- Contributed to the Academic Strategic Transport Research Alliance (ASTRA) which enabled:
 - research of strategic importance to TMR such as safety, travel behaviour and urban freight movement and logistics
 - leveraging of funding through Australian Research Council (ARC) grants to undertake transport research
 - delivery of transport-related undergraduate and postgraduate subjects and courses to students to ensure the best and brightest minds can tackle future transport opportunities
 - facilitated transport related work experience placements, providing an invaluable opportunity for students to gain work experience and ensure they are 'job ready'
 - QUT, UQ and Griffith to fund and host the Australasian Transport Research Forum 2013
 - Transfer of knowledge between universities and TMR and its stakeholders of current and emerging transport issues by academics from international universities.
- Committed funding of \$200,000 per annum for five years (from June 2012) for the Chair of Structural Engineering, The University of Queensland.
- Provided \$165,000 in funding to the Sustainable Built Environment National Research Centre to support innovative solutions to infrastructure/transport related issues.
- Supporting participant in the Cooperative Research Centre for Rail Innovation (Rail CRC).

Motor Accident Insurance Commission

- Provided support for the Academic Strategic Research Transport Alliance to undertake collaborative research in the area of future transport challenges and road safety.
- Operational funding for the Centre of National Research on Disability and Rehabilitation Medicine.
- Funding for the Centre for Accident Research and Road Safety Queensland with additional funding provided by QUT.

Appendix B – Australian Bureau of Statistics classifications

Table 2: The Socio-Economic Objective (SEO) classification as defined by the Australian Bureau of Statistics (1297.0 - Australian and New Zealand Standard Research Classification (ANZSRC), 2008)

The ANZSRC SEO classification allows R&D activity to be categorised according to the intended purpose or outcome of the research, rather than the processes or techniques used in order to achieve this objective.

| SEO SECTOR AND DIVISION CODES AND TITLES |
|--|
| Sector A: Defence |
| 81 Defence |
| Sector B: Economic Development |
| 82 Plant Production and Plant Primary Products |
| 83 Animal Production and Animal Primary Products |
| 84 Mineral Resources (excl. Energy Resources) |
| 85 Energy |
| 86 Manufacturing |
| 87 Construction |
| 88 Transport |
| 89 Information and Communication Services |
| 90 Commercial Services and Tourism |
| 91 Economic Framework |
| Sector C: Society |
| 92 Health |
| 93 Education and Training |
| 94 Law, Politics and Community Services |
| 95 Cultural Understanding |
| Sector D: Environment |
| 96 Environment |
| Sector E: Expanding Knowledge* |
| 97 Expanding Knowledge |

*Sector E Expanding Knowledge is for the categorisation of R&D which does not have an identifiable socio-economic objective. This is usually the case for pure basic research or strategic basic research, as defined in the Type of Activity classification. Applied research and experimental development, by definition, have an identified socio-economic objective and therefore should not be categorised.

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/1297.0Main%20Features62008?opendocument&tabname=Summary&prodno=1297.0&issue=2008&num=&view=>

Table 3: The Fields of Research (FOR) classification as defined by the Australian Bureau of Statistics (1297.0 - Australian and New Zealand Standard Research Classification (ANZSRC), 2008)

The ANZSRC FOR allows R&D activity to be categorised according to the methodology used in the R&D, rather than the activity of the unit performing the R&D or the purpose of the R&D.

| FOR DIVISION CODES AND TITLES |
|---|
| 01 Mathematical Sciences |
| 02 Physical Sciences |
| 03 Chemical Sciences |
| 04 Earth Sciences |
| 05 Environmental Sciences |
| 06 Biological Sciences |
| 07 Agricultural and Veterinary Sciences |
| 08 Information and Computing sciences |
| 09 Engineering |
| 10 Technology |
| 11 Medical and Health Sciences |
| 12 Built Environment and Design |
| 13 Education |
| 14 Economics |
| 15 Commerce, Management, Tourism and Services |
| 16 Studies in Human Society |
| 17 Psychology and Cognitive Sciences |
| 18 Law and Legal Studies |
| 19 Studies in creative Arts and Writing |
| 20 Language, Communication and Culture |
| 21 History and Archaeology |
| 22 Philosophy and Religious Studies |

In the interests of international statistical comparisons, the FOR classification, as far as is practicable, aligns at the two digit Division level with the OECD's Fields of Science 2007 classification.

<http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/1297.0Main%20Features52008?opendocument&tabname=Summary&prodno=1297.0&issue=2008&num=&view=>

Appendix C – Revised Queensland Science and Research Priorities

The Queensland Science and Research Priorities and objectives used in this report were developed and reviewed by the OQCS, DSITIA, and the R&D Queensland Committee in October 2013. Ten science and research priorities were developed to guide future investment in order to deliver practical research to unlock the state's potential. They were developed with industry, academia, and the university and research sector after an extensive consultation process.

In March 2015 the Queensland Chief Scientist reviewed the *Queensland Science and Research Priorities* to ensure they are focused on well-defined areas, use our competitive advantages, and reflect identified needs and activities the government considers important. The *Revised Queensland Science and Research Priorities* published in June 2015 have included services innovation and the role of science and technology therein.

The Revised Queensland Science and Research Priorities:

- Delivering productivity growth and jobs for Queensland by developing **enhanced production technologies, tools and practices** particularly in the **agricultural, mining, advanced manufacturing** and supporting sectors including **engineering services**
- Growing our **knowledge intensive services** through **science, research and innovation**
- **Protecting our biodiversity** and heritage, marine and terrestrial, with particular focus on the **Great Barrier Reef**
- Natural advantage **cleaner, and renewable energy technologies** development (e.g. gas, solar, biofuels)
- Ensuring the **sustainability of our physical** and especially our **digital infrastructure** critical for research and - correspondingly - strategically leveraging national programs (including making use of 'big data')
- **Building resilience and managing climate risk**, through the design and development of construction technologies for extreme weather event resistance (floods, cyclones, droughts), **particularly in tropical environments**
- Early detection, treatment, and (ultimately) prevention of **age-related and Queensland dominant diseases** (e.g. skin, tropical)
- Improving **health** data management and **services delivery** (including telemedicine)
- Ensuring **sustainable water use** and delivering **quality water and water security** in a variable climate and in a resources-intensive economy
- **Digitally-enabled technologies**, e.g. the development and application of advanced modelling, visualisation, sensing and simulation technologies, tools and practices, including robotics

The complete reviewed set of priorities is available on the Queensland Chief Scientist website (<http://www.chiefscientist.qld.gov.au/images/documents/chiefscientist/qld-science-n-research-priorities-2015-2016.pdf>).

Appendix D – Decision Rules for Investment (R.E.D.S.)

The Queensland Government invests in research and development and partners with Queensland's universities and research institutions to deliver practical research that benefits Queenslanders. While we can use much of the knowledge and tools developed nationally and internationally, Queensland is impacted by specific issues and opportunities which require focused R&D efforts.

The R.E.D.S Decision Rules were developed to ensure our R&D investments are targeted and impactful. The rules can be used to assess an entire portfolio or a single project. When used in conjunction with the Queensland Science and Research Priorities the rules aim to create a research and innovation community that delivers great outcomes locally, nationally and internationally.

R Real future impact
E External commitment
D Distinctive angle
S Scaling toward critical mass

Real future impact

What will be the tangible benefit for Queensland, and how long will it take to happen?

- The impact can be economic, environmental and/or social.
- Impact needs to be measurable and advocates should propose the best metric(s) in each domain.
- The mechanism for knowledge exchange and translation of research findings to the commercial/policy/end-use environment is planned, up front, and continually 'top of mind'.

External commitment

What is the involvement of, and commitment from, your external collaborative partners and end-users?

- Capital and resources (including leadership and manpower) must actually be committed, not contingent (or promised).
- The share of external contributions will typically increase over time, and should be planned accordingly.
- Commitment should be sufficient to see the project through to effective translation.

Distinctive angle

What is in it for Queensland, and why is Queensland the place to conduct the research?

- Distinctiveness might be based either on natural, comparative advantage(s) and/or uniqueness of the research direction.
- Distinctiveness should not readily be imitated by others.
- Quality of the proposal, proposers and collaborators is pivotal; track record is the best indicator of future performance in this regard.
- Consistency with national objectives—for example helping build relevant national capacity—requires due consideration.

Scaling towards critical mass

How, and with whom, will you be collaborating on your research, locally (i.e. statewide) as well as nationally and/or internationally, to achieve quality and significant capability in Queensland?

- Collaboration and (potentially) co-location are to be rewarded. This should not only include collaboration between researchers, but also between researchers and end-users or industry.
- People mobility, 'both ways', is key to quality translation and knowledge exchange (for commercial, policy and end use uptake).
- Critical mass, and significance, needs to be measured in both a detailed manner, as well as a global manner. We need to be particular. For example, we should assess our specific capabilities in 'gene silencing' in a global context, rather than assessing our 'biotech' capacity in the region.

Appendix E – Funding tables

Table 4: Total Queensland Government R&D* expenditure by agency for 2013-14 (Queensland Government funding + leveraged funds)

| Queensland Government Agency | Qld Govt Expenditure (\$m) | % of Total | Leveraged Funds (\$m) | % of Total | Qld Govt + Leveraged Funds (\$m) | % of Total |
|---|-------------------------------|-------------|--------------------------|-------------|--|-------------|
| Department of Aboriginal and Torres Strait Islander and Multicultural Affairs | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of Agriculture, Fisheries and Forestry | 63 | 34% | 33 | 19% | 96 | 26% |
| Department of Communities, Child Safety and Disability Services | 0 | 0% | 4 | 2% | 5 | 1% |
| Department of Education, Training and Employment | 5 | 3% | 11 | 6% | 16 | 4% |
| Department of Energy and Water Supply | 2 | 1% | 0 | 0% | 2 | 0% |
| Department of Environment and Heritage Protection | 2 | 1% | 0 | 0% | 2 | 0% |
| Department of Health | 32 | 18% | 1 | 0% | 33 | 9% |
| Department of Housing and Public Works | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of Justice and Attorney General | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of National Parks, Recreation, Sport and Racing | 0 | 0% | 1 | 0% | 1 | 0% |
| Department of Natural Resources and Mines | 20 | 11% | 1 | 1% | 21 | 6% |
| Department of Science, Information Technology, Innovation and the Arts | 44 | 24% | 50 | 28% | 94 | 26% |
| Science Delivery | 6 | 3% | 3 | 1% | 8 | 2% |
| Science Development | 39 | 21% | 47 | 27% | 86 | 24% |
| Department of the Premier & Cabinet | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of Transport and Main Roads | 2 | 1% | 4 | 2% | 6 | 2% |
| Public Safety Business Agency | 0 | 0% | 0 | 0% | 0 | 0% |
| Queensland Fire and Emergency Services | 0 | 0% | 0 | 0% | 0 | 0% |
| Queensland Police | 0 | 0% | 0 | 0% | 0 | 0% |
| Hospital and Health Services | 7 | 4% | 23 | 13% | 30 | 8% |
| Children's Health Queensland Hospital and Health Service | 3 | 2% | 4 | 2% | 8 | 2% |
| Darling Downs Hospital and Health Service | 0 | 0% | 0 | 0% | 0 | 0% |
| Gold Coast Hospital and Health Service | 0 | 0% | 0 | 0% | 0 | 0% |
| Mackay Hospital and Health Service | 0 | 0% | 0 | 0% | 0 | 0% |
| Metro North Hospital and Health Service** | 2 | 1% | 8 | 5% | 10 | 3% |
| Metro South Hospital and Health Service | 0 | 0% | 9 | 5% | 9 | 2% |
| Sunshine Coast Hospital and Health Service | 1 | 0% | 1 | 1% | 2 | 1% |
| West Moreton Hospital and Health Service | 0 | 0% | 0 | 0% | 1 | 0% |
| Statutory Bodies | 6 | 3% | 50 | 28% | 56 | 15% |
| Motor Accident Insurance Commission | 5 | 3% | 6 | 3% | 11 | 3% |
| Queensland Competition Authority | 1 | 1% | 0 | 0% | 1 | 0% |
| Queensland Institute of Medical Research | 0 | 0% | 43 | 24% | 43 | 12% |
| Queensland Museum | 1 | 0% | 1 | 0% | 1 | 0% |
| Total | 185 | 100% | 178 | 100% | 363 | 100% |

**Data for the Metro North HHS was not provided for 2013-14 so 2012-13 data was substituted in its place. The following HHSs provided a nil return: Cairns and Hinterland HHS, Central Queensland HHS, Central West HHS, North West HHS, South West HHS, Torres and Cape York HHS, Townsville HHS and Wide Bay HHS.

Table 5: Total Queensland Government R&D* expenditure by agency for 2013-14 (In-house + External funds)

| Queensland Government Agency | In-house Funds (\$m) | % of Total | External Funds (\$m) | % of Total | Total (\$m) | % of Total |
|---|----------------------|-------------|----------------------|------------|-------------|-------------|
| Department of Aboriginal and Torres Strait Islander and Multicultural Affairs | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of Agriculture, Fisheries and Forestry | 79 | 53% | 17 | 8% | 96 | 26% |
| Department of Communities, Child Safety and Disability Services | 0 | 0% | 5 | 2% | 5 | 1% |
| Department of Education, Training and Employment | 3 | 2% | 13 | 6% | 16 | 4% |
| Department of Energy and Water Supply | 0 | 0% | 2 | 1% | 2 | 0% |
| Department of Environment and Heritage Protection | 1 | 1% | 1 | 0% | 2 | 0% |
| Department of Health | 4 | 3% | 29 | 13% | 33 | 9% |
| Department of Housing and Public Works | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of Justice and Attorney General | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of National Parks, Recreation, Sport and Racing | 0 | 0% | 1 | 0% | 1 | 0% |
| Department of Natural Resources and Mines | 18 | 12% | 3 | 1% | 21 | 6% |
| Department of Science, Information Technology, Innovation and the Arts | 8 | 6% | 86 | 40% | 94 | 26% |
| Science Delivery | 8 | 6% | 0 | 0% | 8 | 2% |
| Science Development | 0 | 0% | 86 | 40% | 86 | 24% |
| Department of the Premier & Cabinet | 0 | 0% | 0 | 0% | 0 | 0% |
| Department of Transport and Main Roads | 4 | 3% | 2 | 1% | 6 | 2% |
| Public Safety Business Agency | 0 | 0% | 0 | 0% | 0 | 0% |
| Queensland Fire and Emergency Services | 0 | 0% | 0 | 0% | 0 | 0% |
| Queensland Police | 0 | 0% | 0 | 0% | 0 | 0% |
| Hospital and Health Services | 28 | 19% | 1 | 1% | 30 | 8% |
| Children's Health Queensland Hospital and Health Service | 8 | 5% | 0 | 0% | 8 | 2% |
| Darling Downs Hospital and Health Service | 0 | 0% | 0 | 0% | 0 | 0% |
| Gold Coast Hospital and Health Service | 0 | 0% | 0 | 0% | 0 | 0% |
| Mackay Hospital and Health Service | 0 | 0% | 0 | 0% | 0 | 0% |
| Metro North Hospital and Health Service** | 10 | 7% | 0 | 0% | 10 | 3% |
| Metro South Hospital and Health Service | 9 | 6% | 0 | 0% | 9 | 2% |
| Sunshine Coast Hospital and Health Service | 1 | 0% | 1 | 1% | 2 | 1% |
| West Moreton Hospital and Health Service | 1 | 0% | 0 | 0% | 1 | 0% |
| Statutory Bodies | 1 | 1% | 56 | 26% | 57 | 16% |
| Motor Accident Insurance Commission | 0 | 0% | 11 | 5% | 11 | 3% |
| Queensland Competition Authority | 1 | 1% | 1 | 0% | 2 | 1% |
| Queensland Institute of Medical Research | 0 | 0% | 43 | 20% | 43 | 12% |
| Queensland Museum | 0 | 0% | 1 | 1% | 2 | 0% |
| Total | 147 | 100% | 216 | 74% | 363 | 100% |

**Data for the Metro North HHS was not provided for 2013-14 so 2012-13 data was substituted in its place. The following HHSs provided a nil return: Cairns and Hinterland HHS, Central Queensland HHS, Central West HHS, North West HHS, South West HHS, Torres and Cape York HHS, Townsville HHS and Wide Bay HHS.