

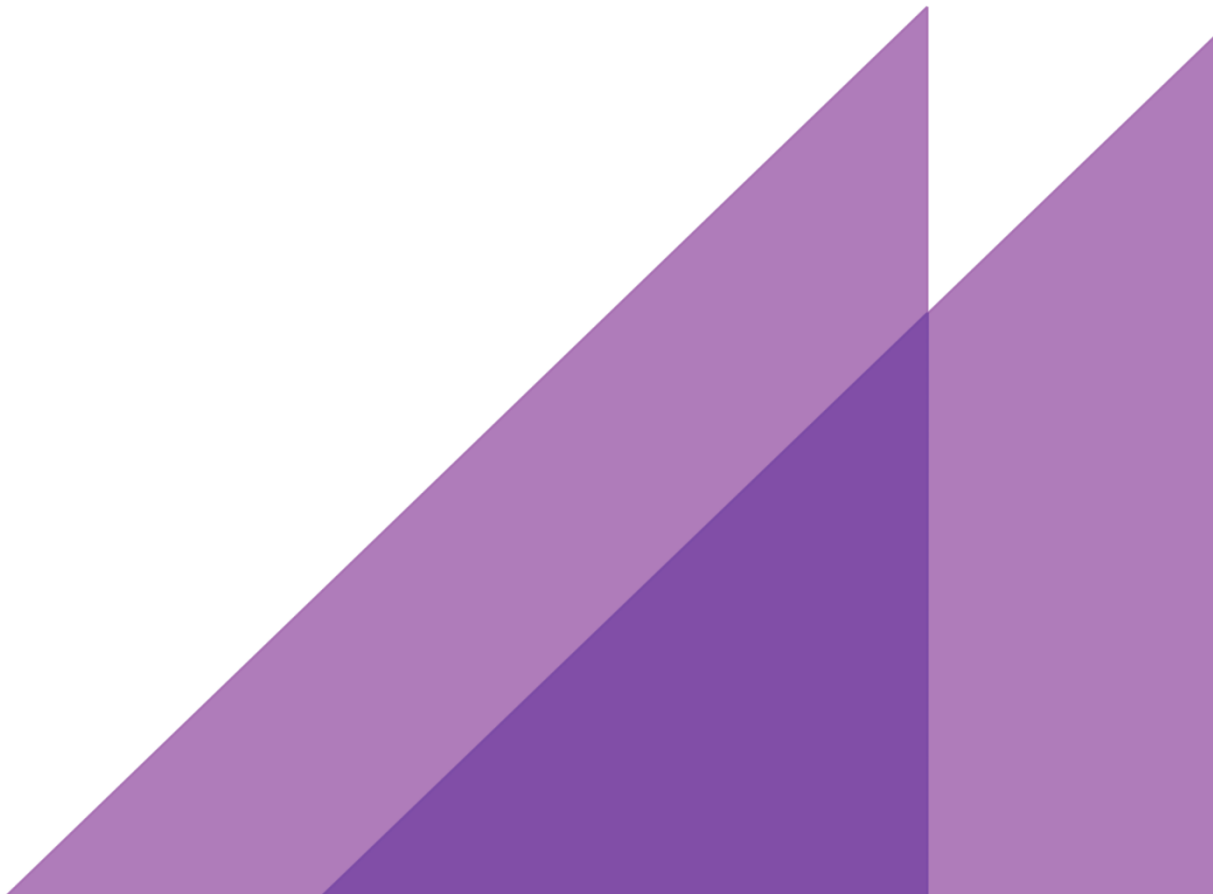
REPORT TO
CSIRO

DECEMBER 2014

CSIRO's IMPACT AND VALUE



AN INDEPENDENT
EVALUATION





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Executive Summary

This report assesses
CSIRO's impact and value

There is strong evidence of
high impact and value

A highly conservative
analysis of six case studies
that consume less than 7% of
CSIRO's annual operating
budget created more than
\$1b a year in benefits

With a slightly less
conservative approach the
case study benefits exceed
the whole of CSIRO costs

Broader factors drive the
expected value past \$5 billion
annually...

...delivering an estimated
benefit-cost for Flagship and
core activity of 5:1

Other unquantified value
components would add
significantly to the overall
benefit-cost ratio

This report has been prepared for the Commonwealth Scientific and Industrial Research Organisation (CSIRO) by ACIL Allen Consulting Pty Ltd (AAC). It provides an independent assessment of the economic, social and environmental impact and value of CSIRO, and compares this to the level of investment it is obtaining from the Australian Government.

Our analysis points to a benefit-cost ratio for CSIRO's activities as a whole that is substantially above 5:1. To arrive at this conclusion, we developed the following 'indicators' of value:

1. First, we assessed the impact and quantified the value of six case studies. ACIL Allen has conservatively estimated that they have created more than \$1.029 billion per annum in value, which on its own exceeds CSIRO's total appropriation. These case studies account for less than 7 per cent of CSIRO's annual operating costs, and around 11 per cent of CSIRO's annual appropriation.
 - This indicates a conservative benefit-cost ratio for this group of CSIRO activities of over 12:1 and establishes a conservative lower-bound for the value delivered by CSIRO as a whole.
 - › Box ES1 lists some of the highlights from the case studies.
2. However, we recognise that our quantification of case study benefits used highly conservative assumptions, in addition, we were unable to quantify all the benefits of the case studies. When we probe both the nature of the assumptions used and some of the dimensions of value that were not quantified, we conclude that the case studies should be attributed with a substantially higher value than the initial conservative assessment described above.
 - We conclude that a more realistic estimate of the expected benefits from the six case studies would be at least 25 per cent higher, at about \$1,286 million annually. This exceeds CSIRO's total annual operating budget.
3. We then examined areas of Flagship and Core Program activity not covered by the case studies. To do so we drew on information from past studies and consider how the case studies were selected and consider some of the long- and short-listed 'candidates' that were not selected as case studies. We conclude that taking into account these factors could add around a further \$4 billion in annual value. Indeed, we argue that the extra value could be significantly higher.
 - This increases our estimate of the annual value delivered by CSIRO to at least \$5 billion.
 - This supports a still rather conservative assessment of the expected benefit-cost ratio for all of CSIRO's activities of around 5:1.
4. In addition, we have also recognised, and assessed as highly valuable, a number of other elements of CSIRO's whole portfolio – including the value of its 'standing capabilities', i.e. the ability to quickly respond to new (and sometimes urgent) demands for scientific information in response to unexpected threats (or opportunities). We also considered the value delivered by CSIRO's advisory services and educational services.
 - We did not seek to quantify these benefits, but are confident they would add substantially to the overall value of CSIRO. This implies that the expected benefit-cost ratio of CSIRO as a whole is well above 5:1.

In developing our assessment of value we have sought to strike a balance between extreme conservatism and arriving at a reasonable but still highly defensible assessment of the magnitude of the benefit-cost ratio that could realistically be expected to emerge if the analysis were able to be extended across the entire CSIRO portfolio.

The report focuses on the current CSIRO strategy period (2011-2015). However, it takes into account the fact that the value and impact of CSIRO's activities across this period have drawn heavily on earlier work and capability established before 2011. Similarly, many of the impacts identified here can be expected to occur beyond 2015. Our benefits calculations are based on the use of CSIRO's indicator discount rate of 5% (after inflation). However, the analysis was also done using a discount rate of 7%, and the results were little affected.

We conclude that the whole of CSIRO portfolio is delivering an expected return that supports an expected benefit-cost ratio of at least 5:1, and arguably substantially more.

Box ES 1 Selected highlights from the case studies

Some of the key findings from ACIL Allen's evaluation of the case studies are listed below:

- The Australian Animal Health Laboratory (AAHL) provides insurance value, in relation to a potential outbreak of foot and mouth disease, equal to \$431 million per annum, as well as broader disease mitigation and outbreak response mechanisms for diseases that affect industries worth over \$14 billion per annum.
- CSIRO's cotton varieties research has delivered net benefits in terms of increased cotton productivity of \$149.3 million over the period 2006/7 to 2013/14 and is forecast to deliver additional benefits of \$379.5 million over the next decade.
- CSIRO's longwall automation technology has resulted in a 5 per cent increase in the productivity of longwall underground coal mining and is expected to deliver net benefits of \$785.6 million between 2001/2 and 2024/25.
- CSIRO's HVAC energy management system, OptiCOOL, has yielded energy savings of 10-30 per cent in commercial buildings and is expected to deliver net benefits of \$79.7 million between 2014/15 and 2024/25.
- CSIRO's prawn breeding and prawn breed research is expected to deliver net benefits, in terms of increase productivity of prawn production, equal to \$882.8 million over the period 2004/5 to 2023/24.
- CSIRO's integrated water resources assessments have delivered benefits of between \$685 million and \$1.24 billion, although this represents quantification of only a small portion of impacts. Actual benefits are likely to be higher than this estimate.

Further information on each of the case studies can be found in Section 3 and in Appendix B to Appendix H.

Source: ACIL Allen Consulting