Horticulture Impact Assessment Program:

Appendix 7: Nursery Industry Statistics and Research (NY16004 Impact Assessment)

Impact analyst:

Michael Clarke

Delivery partner:

AgEconPlus and Agtrans Research

Project code:

MT18011

Date:

19 September 2019

Funding statement:

This project has been funded by Hort Innovation, using research and development levies and contributions from the Australian Government. Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

Publishing details:

Published and distributed by: Hort Innovation

Level 7
141 Walker Street
North Sydney NSW 2060

Telephone: (02) 8295 2300

www.horticulture.com.au

Contents

Tables

Figures

Executive Summary

What the report is about

This report presents the results of an impact assessment of a Horticulture Innovation Australia Limited (Hort Innovation) investment in *NY16004: Nursery Industry Statistics and Research.* The project was funded by Hort Innovation over the period January 2017 to November 2017.

Methodology

The investment was first analysed qualitatively within a logical framework that included activities and outputs, outcomes and impacts. Actual and/or potential impacts then were categorised into a triple bottom line framework. Principal impacts identified were then considered for valuation in monetary terms (quantitative assessment). Past and future cash flows were expressed in 2017/18 dollar terms and were discounted to the year 2018/19 using a discount rate of 5% to estimate the investment criteria and a 5% reinvestment rate to estimate the modified internal rate of return (MIRR).

Results/key findings

The investment is likely to contribute to improved financial performance for a percentage of greenlife businesses making use of resultant statistics and the benchmarking tool. The investment is also likely to improve nursery industry resource allocation including research, marketing and biosecurity budgets. Data from the project will be available to government to inform policy development affecting the nursery industry. Consumers of nursery products and services will realise marginal gains in utility. Capacity has been built in the collection and interpretation of industry data.

Investment Criteria

Total funding from all sources for the project was $0.23 million (present value terms). The investment produced estimated total expected benefits of $0.89 million (present value terms). This gave a net present value of $0.66 million, an estimated benefit-cost ratio of 3.8 to 1, an internal rate of return of 33% and a MIRR of 10%.

Conclusions

While several economic and social impacts identified were not valued, the impacts were considered indirect, uncertain and/or minor compared with the impact valued. Nevertheless, combined with conservative assumptions for the impacts valued, investment criteria as provided by the valuation may be underestimates of the actual performance of the investment.

Keywords

Impact assessment, cost-benefit analysis, NY16004, nursery, industry, statistics, research, nursery data tool, benchmarking, farm gate production value, 2015/16, nursery growers

Introduction

Horticulture Innovation Australia Limited (Hort Innovation) required a series of impact assessments to be carried out annually on a number of investments in the Hort Innovation research, development and extension (RD&E) portfolio. The assessments were required to meet the following Hort Innovation evaluation reporting requirements:

- Reporting against the Hort Innovation's current Strategic Plan and the Evaluation Framework associated with Hort Innovation's Statutory Funding Agreement with the Commonwealth Government.
- Reporting against strategic priorities set out in the Strategic Investment Plan (SIP) for each Hort Innovation industry fund.
- Annual Reporting to Hort Innovation stakeholders.
- Reporting to the Council of Rural Research and Development Corporations (CRRDC).

The first series of impact assessments included 15 randomly selected Hort Innovation RD&E investments (projects) worth a total of approximately $9.31 million (nominal Hort Innovation investment). The investments were selected from an overall population of 85 Hort Innovation investments worth an estimated $50.38 million (nominal Hort Innovation investment) where a final deliverable had been submitted in the 2017/18 financial year.

The 15 investments were selected through a stratified, random sampling process such that investments chosen represented at least 10% of the total Hort Innovation RD&E investment in the overall population (in nominal terms) and was representative of the Hort Innovation investment across six, pre-defined project size classes.

Project *NY16004: Nursery Industry Statistics and Research* was selected as one of the 15 investments and was analysed in this report.

General Method

The impact assessment follows general evaluation guidelines that are now well entrenched within the Australian primary industry research sector including Research and Development Corporations, Cooperative Research Centres, State Departments of Agriculture, and some universities. The approach includes both qualitative and quantitative descriptions that are in accord with the impact assessment guidelines of the CRRDC (CRRDC, 2018).

The evaluation process involved identifying and briefly describing project objectives, activities and outputs, outcomes, and impacts. The principal economic, environmental and social impacts were then summarised in a triple bottom line framework.

Some, but not all, of the impacts identified were then valued in monetary terms. Where impact valuation was exercised, the impact assessment uses cost-benefit analysis as its principal tool. The decision not to value certain impacts was due either to a shortage of necessary evidence/data, a high degree of uncertainty surrounding the potential impact, or the likely low relative significance of the impact compared to those that were valued. The impacts valued are therefore deemed to represent the principal benefits delivered by the project. However, as not all impacts were valued, the investment criteria reported for individual investments potentially represent an underestimate of the performance of that investment.

Background & Rationale

Background

The Australian nursery industry includes plant producers and retail nurseries (garden centres) as well as the businesses that manufacture, import and supply the products and services sold through these and other retail outlets such as hardware stores and supermarkets. These include seed producers, plant propagators, producers of mulch and fertilisers and garden equipment. The nursery and garden industry is also supported by a substantial number of businesses which are engaged in the care and maintenance of gardens, for example lawn mowing contractors.

The greenlife component of the nursery industry is involved in the ornamental market, large scale forestry nurseries, revegetation for mining, landscaping and starter plants for Australia's fruit and vegetable production. The nursery industry plays a vital role in providing health, economic, environmental and wellbeing benefits for all Australians.

The nursery industry has a national levy struck at 5% of the sale price or landed cost price of a container (pot). Hort Innovation manages the proportion of nursery levy funds that is directed to investment in nursery research and marketing programs (4.75%). Separately Plant Health Australia manages biosecurity funds (0.25%). Nursery & Garden Industry Australia (NGIA) is the peak industry body for the nursery and garden industry. The vision of the NGIA is to create a climate in which the industry can grow and prosper.

Rationale

To grow and prosper the industry needs reliable data including number of businesses in the industry, volume of products sold, farm gate value of greenlife, production area, employment, industry outlook and sentiment. These data are missing from the industry and there are challenges and difficulties in its collection. Challenges include the diversity of the industry, plants can be sold a number of times before the end user, it is unlike the homogeneity of production horticulture and there is a general reluctance of industry members to participate in data collection.

There is a critical need to capture timely and accurate data for analysis on the Australian nursery and garden industry to inform industry decision making, resource prioritisation, investment evaluation, strategic planning activities, market trends and tracking industry performance over time.

In 2010, Horticulture Australia Limited (HAL) project NY11004 Industry Market Data sought to fill the industry data gap with a monthly data collection from industry. Even with extensive publicity the project failed to launch due to low participation. In its place, a point in time survey was rolled out and achieved only a conservative response. The survey was not supported with a proper sampling technique and provided only raw anonymous data.

In 2017, Hort Innovation project NY16004 Nursery Industry Statistics and Research addressed challenges and barriers to data collection with a top down/bottom up approach and a multi-disciplinary team that included NGIA, social and market research company Down to Earth Research and economic and policy analysts ACIL Allen.

Project Details

Summary

Project Code: NY16004

Title: Nursery Industry Statistics and Research

Research Organisation: Nursery & Garden Industry Australia Limited

Principal Investigator: Peter Vaughan

Period of Funding: January 2017 to November 2017

Objectives

The primary objectives of the project were to:

1. Complete an assessment of nursery industry data users and contributors, identify attitudes towards data sharing, data requirements and industry capacity to provide information.
2. Complete a desk-based audit of nursery industry research, legacy data and legacy data gaps.
3. Complete 300 computer assisted telephone interviews of a random sample of businesses to obtain a primary data set.
4. Deliver accurate and verified industry statistics including but not limited to number of businesses, volume of products sold, farm gate value of greenlife and production area.
5. Provide an evaluation of industry and past performance including key trends and issues, an insight into industry sentiment, commentary on future development and growth opportunities using primary and secondary data.
6. Deliver data tools for data users based on their needs and priorities.

Logical Framework

The focus of NY16004 was to develop a well-supported, repeatable and useful data set for the Australian nursery industry. Table 1 provides a detailed description of the project in a logical framework.

Table 1: Logical Framework for Project NY16004

Activities and Outputs	• Stage 1: Data audit, end user and data contributor consultation - audit existing unreliable legacy data and previous attempts to collect data from industry. Complete end user consultation to determine data requirements (e.g. granularity, frequency, collection method) and willingness to pay for an industry statistics/research product. • Stage 2: Data collection, planning, design, execution and analysis - indicator mapping, legacy data links, survey design and case study preparation. Test industry willingness to contribute data, sample a survey of greenlife businesses to collect 2015/16 data, complete initial data analysis and relevant case studies. The survey sample was randomly selected and 221 data sets were collected from a population of 2,374 unique organisations using telephone interviews. 300 data sets had been targeted. • Stage 3: Data tool development – development of an industry statistics and benchmarking tool supplied directly to survey participants and other levy payers by request. Tool tested with end users to ensure it was useful and cost effective to deliver. • Credible data on the economic, financial, spatial and biological dimensions of the industry was collected including number of businesses, greenlife products, farm gate value of greenlife, production area, employment, industry outlook and sentiment. • A tool that provides market insight, dashboards, benchmark capability and short reports on industry status. The tool is available to levy payers via the Hort Innovation website. • National data for use in business/industry planning, economic contribution studies, marketing strategies, research planning and biosecurity interventions. • A recommendation that the project be supported on an ongoing basis. • Results communicated to levy payers through NGIA Nursery Papers – an established nursery industry extension channel via Hort Innovation. Also YouTube, Facebook,

	Twitter and LinkedIn. • A media release prepared by Cox Inall Communications and released December 2017. • Results communicated to the Nursery Industry Strategic Investment Advisory Panel (SIAP) to inform research and marketing priorities and project design. Results provided to public agencies including DAWR and Plant Health Australia. • Results adapted into the Horticulture Statistics Handbook. • Benchmarking tool supplied to all 221 survey participants and requested by a further 35 production nurseries during 2018.
Outcomes	• Relevant and timely data in the hands of stakeholders to aid decision making. Key stakeholders include nursery and garden businesses, banks and insurance companies, state and national industry associations, researchers (public and private), the Hort Innovation SIAP, Plant Health Australia and government departments. • For the first time industry has credible data to inform decision making, resource prioritisation, strategic planning, the analysis of market trends and the tracking of performance.
Impacts	• Cost reduction for a portion of nursery businesses utilising project generated data to make more informed decisions. • Increased demand for nursery products and services which are better targeted to prevailing market conditions. • Improved resource allocation – industry research, marketing and biosecurity budgets that better reflect the 'real world' situation (and realise an efficiency dividend). • Improved policy development for the nursery industry based on sound statistical data. • More efficient formation of government economic policies from improved statistical data on the industry (spill-over). • Higher utility gained by consumers of nursery products and services. • Capacity built in industry and capacity built in researchers in the collection and interpretation of data.

Project Investment

Nominal Investment

Table 2 shows the annual investment (cash and in-kind) in project NY16004 by Hort Innovation. There were no 'other' investors in this project.

Table 2: Annual Investment in the Project NY16004 (nominal $)

Year ended 30 June	Hort Innovation ($)	Other ($)	Total ($)
2017	63,950	0	63,950
2018	122,600	0	122,600
Totals	**186,550**	**0**	**186,550**

Program Management Costs

For the Hort Innovation investment the cost of managing the Hort Innovation funding was added to the Hort Innovation contribution for the project via a management cost multiplier (1.162). This multiplier was estimated based on the share of 'payments to suppliers and employees' in total Hort Innovation expenditure (3-year average) reported in the Hort Innovation's Statement of Cash Flows (Hort Innovation Annual Report, various years). This multiplier was then applied to the nominal investment by Hort Innovation shown in Table 2.

Real Investment and Extension Costs

For the purposes of the investment analysis, investment costs of all parties were expressed in 2017/18 dollar terms using the GDP deflator index. 'Extension' costs were included in budget totals – media releases, the Nursery Papers and industry statistics were provided to industry as part of the project.

Impacts

Table 3 provides a summary of the principal types of impacts delivered by the project. Impacts have been categorised into economic, environmental and social impacts.

Table 3: Triple Bottom Line Categories of Principal Impacts from Project NY16004

Economic	• Cost reduction for a portion of nursery businesses utilising project generated data to make more informed decisions. • Increased demand for nursery products and services which are better targeted to prevailing market conditions. • Improved resource allocation – industry research, marketing and biosecurity budgets that better reflect the 'real world' situation (and realise an efficiency dividend). • Improved policy development for the nursery industry based on sound statistical data. • More efficient formation of government economic policies from improved statistical data on the industry (spill-over).
Environmental	• Nil.
Social	• Higher utility gained by consumers of nursery products and services. • Capacity built in industry and capacity built in researchers in the collection and interpretation of data.

Public versus Private Impacts

The majority of impacts identified in this evaluation are nursery industry related and therefore are considered private benefits. However, some consumer surplus will be gained by those purchasing nursery products and services and governments (and their constituents) will benefit from more informed policy development.

Distribution of Private Impacts

In so far as some segments of the industry supply inputs to other segments (e.g. production nurseries supplying plants to retail garden centres), benefits from any change in business performance and demand will be shared by both consumers and producers according to the relevant short- and long-term supply and demand elasticities.

Impacts on Other Australian Industries

It is likely that most impacts will be confined to the nursery industry.

Impacts Overseas

It is unlikely that there will be any significant spill-over impacts to overseas interests.

Match with National Priorities

The Australian Government's Science and Research Priorities and Rural RD&E priorities are reproduced in Table 4. The project findings and related impacts will contribute primarily to Rural RD&E Priority 4, and to Science and Research Priority 1 and 2.

Table 4: Australian Government Research Priorities

Australian Government	
Rural RD&E Priorities (est. 2015)	**Science and Research Priorities (est. 2015)**
1. Advanced technology 2. Biosecurity 3. Soil, water and managing natural resources 4. Adoption of R&D	1. Food 2. Soil and Water 3. Transport 4. Cybersecurity 5. Energy and Resources 6. Manufacturing 7. Environmental Change 8. Health

Sources: (DAWR, 2015) and (OCS, 2015)

Alignment with the Nursery Strategic Investment Plan 2017-2021

The strategic outcomes and strategies of the nursery industry are outlined in the Nursery Strategic Investment Plan 2017-2021[1] (Hort Innovation, 2016). Project NY16004 addressed Nursery Strategic Investment Plan (SIP) Outcome 2, Strategy 2.2.

Valuation of Impacts

Impacts Valued

Analyses were undertaken for total benefits that included future expected benefits. A degree of conservatism was used when finalising assumptions, particularly when some uncertainty was involved. Sensitivity analyses were undertaken for those variables where there was greatest uncertainty or for those that were identified as key drivers of the investment criteria.

Two key groups of impact were valued – (1) improved performance of those greenlife businesses making use of industry statistics and the benchmarking tool as well as (2) improved resource allocation for the nursery industry which is better able to allocate research, marketing and biosecurity budgets.

Impacts Not Valued

Not all of the impacts identified in Table 3 could be valued in the assessment. Policy and social impacts were hard to value due to lack of evidence/data, difficulty in quantifying the causal relationship and pathway between NY16004 and the impact and the complexity of assigning monetary values to the impact.

The policy impacts identified but not valued were:

- Improved policy development for the nursery industry based on sound statistical data.
- More efficient formation of government economic policies from improved statistical data on the industry (spill-over).

The social impacts identified but not valued were:

- Higher utility gained by consumers of nursery products and services.
- Capacity built in industry and capacity built in researchers in the collection and interpretation of data.

[1] For further information, see: https://www.horticulture.com.au/hort-innovation/funding-consultation-and-investing/investment-documents/strategic-investment-plans/

Valuation of Impact 1: Improved Financial Performance Greenlife Businesses

The NY16004 investment provided statistics and a benchmarking tool that is one input that can be used to improve decision making at the individual greenlife business level. The nature of the improvements are assumed to be both cost reductions and enhanced demand.

Attribution

An 80% attribution factor has been assumed for NY16004's contribution to improved financial performance of greenlife businesses to allow for any additional costs associated with achieving cost reductions and enhanced demand.

Counterfactual

The scenario assumed if the investment had not been made is that planning and management decisions based on less information would have been made and hence the benefits identified here would not have been captured.

Valuation of Impact 2: Improved Resource Allocation, Nursery Industry Levies

Accurate data on industry size, composition and trends provided in NY16004 informs resource allocation decisions made by the Hort Innovation Nursery Fund SIAP for research and marketing and Plant Health Australia resource allocation decisions make for biosecurity funds. Together these three funds make decisions about investing $3.81 million per annum (3 year annual average to 2017/18 and including government matching contributions for R&D). With improved industry data available and informing investment decisions, an efficiency dividend of 1% has been assumed.

Attribution

No other projects have contributed to the assumed 1% efficiency gain.

Counterfactual

If the NY16004 investment had not been made this benefit would not have been realised.

Summary of Assumptions

A summary of the key assumptions made for valuation of the impacts is shown in Table 5.

Table 5: Summary of Assumptions

Variable	Assumption	Source/Comment
Impact 1: Improved Financial Performance Greenlife Businesses		
Greenlife business population.	1,777	NY16004 Nursery Industry Statistics & Research Final Report (Vaughan 2017).
Number of businesses aware of NY16004 data and benchmarking tool.	20%	Consultant estimate after considering: (1) industry population of 2,374 businesses and difficulty Down to Earth Research had in securing responses from 221 businesses plus (2) resulting media and publicity when NY16004 final report was released. NB: 38 requests were made for the tool by non-contributing levy payers in the first 12 months after its release.
Proportion of businesses that are aware of NY16004 data and benchmarking tool that make management changes that rely on NY16004 information.	5%	Consultant estimate informed by Agtrans Research (2009).
Proportion of businesses that make changes that rely on NY16004 information that achieve a cost reduction or an increase in revenue.	10%	Consultant estimate informed by Agtrans Research (2009).
Average turnover per	$1 million	NY16004 data shows that most businesses (59%)

business.	per annum	have a turnover of less than $500,000 per year but that businesses with a turnover of more than $2 million per year account for 74% of the industry's GVP. To complete this analysis a typical greenlife business of $1 million per year has been assumed.
Costs as a proportion of turnover.	90%	NY16004 did not report profit as a share of turnover but previous benchmarking studies have estimated it at between 4.6% and 15% (e.g. IBISWORLD) If profit is assumed at 10% of turnover then total costs can be taken as 90% of turnover.
Cost reduction impact.	5%	Consultant estimate informed by Agtrans Research (2009).
Revenue impact.	1%	Consultant estimate informed by Agtrans Research (2009).
Year of first impact.	2018/19	Consultant estimate that assumes measures are implementable in greenlife businesses 12 months after NY16004 completion.
Year in which impact reaches a peak.	2021/22	Consultant estimate informed by Agtrans Research (2009).
Longevity of maximum impact.	10 years	Consultant estimate informed by Agtrans Research (2009).
Attribution.	80%	Consultant estimate made after considering NY16004 final report.
Impact 2: Improved Resource Allocation, Nursery Industry Levies		
Research, marketing and biosecurity funds invested in the nursery industry.	$3.81 million per annum	3 year annual average to 2017/18 and including government matching contributions for R&D.
Efficiency dividend.	1%	Consultant assumption.
Duration of efficiency dividend benefit	5 years commencing 2018/19	Consultant assumption noting that a follow-up tool will be produced for three additional years (2017-18 through 2020-21 under a new investment NY17008).

Results

All costs and benefits were discounted to 2018/19 using a discount rate of 5%. A reinvestment rate of 5% was used for estimating the Modified Internal Rate of Return (MIRR). The base analysis used the best available estimates for each variable, notwithstanding a level of uncertainty for many of the estimates. All analyses ran for the length of the project investment period plus 30 years from the last year of investment (2017/18) as per the CRRDC Impact Assessment Guidelines (CRRDC, 2018).

Investment Criteria

Table 6 shows the investment criteria estimated for different periods of benefit for the total investment. Hort Innovation was the only contributor to this project so there is no second set of analyses showing results for Hort Innovation.

Table 6: Investment Criteria for Total Investment in Project NY16004

Investment Criteria	**Years after Last Year of Investment**						
	0	**5**	**10**	**15**	**20**	**25**	**30**
Present Value of Benefits ($m)	0.00	0.42	0.69	0.88	0.89	0.89	0.89
Present Value of Costs ($m)	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Net Present Value ($m)	-0.23	0.18	0.46	0.65	0.66	0.66	0.66
Benefit-Cost Ratio	0.00	1.78	2.98	3.78	3.82	3.82	3.82
Internal Rate of Return (%)	negative	24.0	32.1	33.4	33.4	33.4	33.4
MIRR (%)	negative	15.6	15.9	14.1	11.9	10.6	9.6

The annual undiscounted benefit and cost cash flows for the total investment for the duration of NY16004 investment plus 30 years from the last year of investment are shown in Figure 1.

Figure 1: Annual Cash Flow of Undiscounted Total Benefits and Total Investment Costs

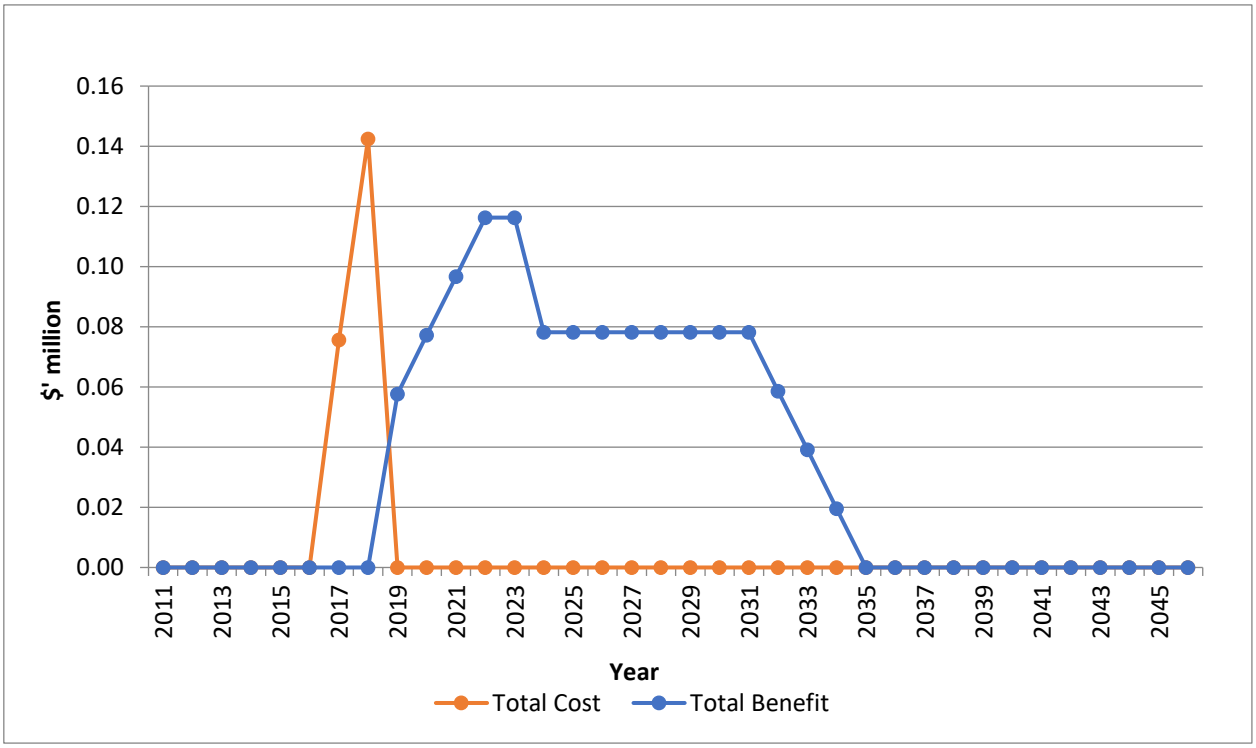

Table 7 shows the contribution of each impact to the total PVB.

Table 7: Contribution of Benefits

Impact	PVB ($M)	% of Total PBV
Impact 1: Improved Financial Performance Greenlife Businesses	0.72	80.6
Impact 2: Improved Resource Allocation Nursery Industry Levies	0.17	19.4
Total	0.89	100.0%

Sensitivity Analyses

A sensitivity analysis was carried out on the discount rate. The analysis was performed for the total investment and with benefits taken over the life of the investment plus 30 years from the last year of investment. All other parameters were held at their base values. Table 8 present the results. The results show a moderate sensitivity to the discount rate.

Table 8: Sensitivity to Discount Rate
(Total investment, 30 years)

Investment Criteria	Discount rate		
	0%	5%	10%
Present Value of Benefits ($m)	1.21	0.89	0.69
Present Value of Costs ($m)	0.22	0.23	0.25
Net Present Value ($m)	0.99	0.66	0.44
Benefit-cost ratio	5.53	3.82	2.79

A sensitivity analysis was then undertaken for the level of cost reduction assumed. Even with half the cost reduction, the project produces a positive return on investment – Table 9.

Table 9: Sensitivity to Level of Cost Reduction Assumed
(Total investment, 30 years)

Investment Criteria	Cost Reduction		
	2.5%	5% (base)	10%
Present Value of Benefits ($m)	0.60	0.89	1.48
Present Value of Costs ($m)	0.23	0.23	0.23
Net Present Value ($m)	0.37	0.66	1.25
Benefit-cost ratio	2.56	3.82	6.35

A final sensitivity analysis tested greenlife business awareness of NY16004. Even if initial business awareness was assumed to be 10%, project benefits would continue to exceed project costs – Table 10.

Table 10: Sensitivity to Industry Awareness of NY16004
(Total investment, 30 years)

Investment Criteria	Greenlife Business Awareness of NY16004		
	10%	20% (base)	40%
Present Value of Benefits ($m)	0.53	0.89	1.61
Present Value of Costs ($m)	0.23	0.23	0.23
Net Present Value ($m)	0.30	0.66	1.38
Benefit-cost ratio	2.28	3.82	6.91

Confidence Rating

The results produced are highly dependent on the assumptions made, some of which are uncertain. There are two factors that warrant recognition. The first factor is the coverage of benefits. Where there are multiple types of benefits it is often not possible to quantify all the benefits that may be linked to the investment. The second factor involves uncertainty regarding the assumptions made, including the linkage between the research and the assumed outcomes.

A confidence rating based on these two factors has been given to the results of the investment analysis (Table 11). The rating categories used are High, Medium and Low, where:

High: denotes a good coverage of benefits or reasonable confidence in the assumptions made

Medium: denotes only a reasonable coverage of benefits or some uncertainties in assumptions made

Low: denotes a poor coverage of benefits or many uncertainties in assumptions made

Table 11: Confidence in Analysis of Project

Coverage of Benefits	Confidence in Assumptions
Medium-high	Medium-low

Coverage of benefits was assessed as Medium-high. The two most important benefits (improved greenlife business performance and improved resource allocation for nursery industry levies) were quantified. Other economic benefits –improved policy development and more efficient government policies, were not valued. Consequently, the investment criteria as provided by the valued benefits are likely to be underestimated to some degree.

Confidence in assumptions was rated as medium-low. Analysis is reliant on a number of assumptions.

Conclusion

The investment in NY16004 is likely to contribute to improved financial performance for a percentage of greenlife businesses making use of resultant statistics and the benchmarking tool. The investment is also likely to improve nursery industry resource allocation including research, marketing and biosecurity budgets. Data from the project will be available to government to inform policy development affecting the nursery industry. Consumers of nursery products and services will realise marginal gains in utility. Capacity has been built in the collection and interpretation of industry data.

Total funding from all sources for the project was $0.23 million (present value terms). The investment produced estimated total expected benefits of $0.89 million (present value terms). This gave a net present value of $0.66 million, an estimated benefit-cost ratio of 3.8 to 1, an internal rate of return of 33% and a modified internal rate of return of 10%.

While several economic and social impacts identified were not valued, the impacts were considered indirect, uncertain and/or minor compared with the impacts valued. Nevertheless, combined with conservative assumptions for the impacts valued, investment criteria as provided by the valuation may be underestimates of the actual performance of the investment.

Glossary of Economic Terms

Cost-benefit analysis:	A conceptual framework for the economic evaluation of projects and programs in the public sector. It differs from a financial appraisal or evaluation in that it considers all gains (benefits) and losses (costs), regardless of to whom they accrue.
Benefit-cost ratio:	The ratio of the present value of investment benefits to the present value of investment costs.
Discounting:	The process of relating the costs and benefits of an investment to a base year using a stated discount rate.
Internal rate of return:	The discount rate at which an investment has a net present value of zero, i.e. where present value of benefits = present value of costs.
Investment criteria:	Measures of the economic worth of an investment such as Net Present Value, Benefit-Cost Ratio, and Internal Rate of Return.
Modified internal rate of return:	The internal rate of return of an investment that is modified so that the cash inflows from an investment are re-invested at the rate of the cost of capital (the re-investment rate).
Net present value:	The discounted value of the benefits of an investment less the discounted value of the costs, i.e. present value of benefits - present value of costs.
Present value of benefits:	The discounted value of benefits.
Present value of costs:	The discounted value of investment costs.

Reference List

Agtrans Research (2009) An Economic Analysis of HAL Investment in Projects in the Market Information Cluster.

Council of Rural Research and Development Corporations. (2018). Cross-RDC Impact Assessment Program: Guidelines. Canberra: Council of Rural Research and Development Corporations. Retrieved from http://www.ruralrdc.com.au/wp-content/uploads/2018/08/201804_RDC-IA-Guidelines-V.2.pdf

Department of Agriculture and Water Resources. (2015). Agricultural Competitiveness White Paper. Canberra: Commonwealth of Australia. Retrieved from http://agwhitepaper.agriculture.gov.au/SiteCollectionDocuments/ag-competitiveness-white-paper.pdf

Hort Innovation (2016) Nursery Strategic Investment Plan 2017-2021. Retrieved at https://www.horticulture.com.au/globalassets/hort-innovation/levy-fund-financial-and-management-documents/sip-pdfs-new/hortinnovation-sip-nursery-2017-2021.pdf

Hort Innovation (2018) Nursery Fund 2017/18 Annual Report. https://www.horticulture.com.au/globalassets/hort-innovation/levy-fund-financial-and-management-documents/fund-annual-report-pdfs/hort-innovation-nursery-fund-2017-18.pdf

Office of the Chief Scientist. (2015). Strategic Science and Research Priorities. Canberra: Commonwealth of Australia. Retrieved from http://www.chiefscientist.gov.au/wp-content/uploads/STRATEGIC-SCIENCE-AND-RESEARCH-PRIORITIES_181214web.pdf

Vaughan, P (2017) NY16004 Nursery Industry Statistics & Research. Final Report prepared for Hort Innovation, December 2018.

Acknowledgements

AgEconPlus and Agtrans Research would like to thank all the project and program personnel associated with Horticulture Innovation Australia Limited that were involved in the evaluation process. Their cooperation and feedback throughout the evaluation process contributed significantly to this report.

Specific acknowledgements:
David Allan, Allan's United Nurseries
Adam Briggs, Senior Analyst, Hort Innovation
David Lullfitz, Plantrite Nursery
Peter Vaughan, Chief Executive Officer, NGIA
Emily White, Boomaroo Nursery

Abbreviations

CRRDC	Council of Research and Development Corporations
DAWR	Department of Agriculture and Water Resources (Australian Government)
GDP	Gross Domestic Product
GVP	Gross Value of Production
IRR	Internal Rate of Return
MIRR	Modified Internal Rate of Return
NGIA	Nursery and Garden Industry Australia
OCS	Office of Chief Scientist Queensland
PVB	Present Value of Benefits
RD&E	Research, Development and Extension
SIAP	Strategic Investment Advisory Panel
SIP	Strategic Investment Plan