Hort Innovation

Final Report

Project title:

Horticulture Impact Assessment Program:

Appendix 4: Facilitating the development of the Australian Strawberry Industry – temperate regional delivery (BS15004 Impact Assessment)

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MT18011

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What the report is about

This report presents the results of an impact assessment of a Horticulture Innovation Australia Limited (Hort Innovation) investment in BS15004: Facilitating the Development of the Australian strawberry industry – temperate regional delivery (Contribution to BS 15002 program delivery). The project was funded by Hort Innovation over the years ending June 2016 to June 2019.

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 2019/20 dollar terms and were discounted to the year 2019/20 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 in this regional delivery project addressed the enhancement of adoption of innovation and technology in the temperate growing regions of the Australian strawberry industry (Victoria, South Australia Tasmania and the southern growing regions of Western Australia).

This has been achieved by an effective and multi-faceted communication program that has directly influenced growers as well as effected improved collaboration between individual growers and stronger relationships between elements in the strawberry value chains. This has resulted in increased adoption of innovative practices and technologies by a proportion of temperate strawberry growers. This contribution to improved management of strawberry growing is likely to lead to future productivity and profitability improvements by some temperate strawberry growers.

Investment Criteria

Total funding from all sources for the project was $0.64 million (present value terms). The investment produced estimated total expected benefits of $2.09 million (present value terms). This gave a net present value of $1.45 million, an estimated benefit-cost ratio of 3.28 to 1, an internal rate of return of 17.4% and a modified internal rate of return of 9.5%. As two of the minor impacts were not valued, the investment criteria estimated by the evaluation may have somewhat underestimated the actual performance of the investment.

Conclusions

The investment in BS15002 has contributed to improved productivity, profitability, and sustainability of strawberry production grown in temperate areas. This impact will result in profit increases for some temperate strawberry growers. This impact was valued using conservative assumptions. However, some of the assumptions on which the valuations are based are not overly well supported by evidence, hence a number of risk factors are associated with a number of assumptions used in the valuation.

Keywords

Impact assessment, cost-benefit analysis, communication, temperate strawberry industry, strawberry 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.
- Annual Reporting to Hort Innovation stakeholders.
- Reporting to the Council of Rural Research and Development Corporations (CRRDC).

Under the impact assessment program (Project MT18011) three series of impact assessments were conducted in calendar 2019, 2020 and 2021. Each included 15 randomly selected Hort Innovation RD&E investments (projects). The third series of impact assessments (current series) was selected from an overall population of 56 Hort Innovation investments worth an estimated $38.9 million (nominal Hort Innovation investment) where a final deliverable had been submitted in the 2019/20 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 BS15004: Facilitating the Development of the Australian strawberry industry – temperate regional delivery (Contribution to BS 15002 program delivery) was randomly selected as one of the 15 investments under MT18011 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 actual and/or potential 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 used 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

The Australian strawberry industry is one of Australia's 'traditional' horticultural industries. Strawberries Australia Inc. is the strawberry industry's peak national agri-political organisation representing strawberry growers. All States have a Strawberry Growers Association affiliated with the national body.

The research and development activities of the strawberry industry are guided by the industry's Strategic Investment Plan (SIP). The activities are funded by levies payable on strawberry runners planted in Australia.

The process of preparing the latest SIP was managed by Hort Innovation in consultation with Strawberries Australia and the Strategic Investment Advisory Panel. The current SIP has been driven by levy payers and addresses the Australian strawberry industry's research and development (R&D) needs from 2017 to 2021.

Industry development programs have been delivered to strawberry growers for many years. The latest program was the Australian strawberry industry development program that commenced in 2016 and consisted of three projects:

- BS15002: National oversight and communications
- BS15003: Subtropical regional delivery
- BS15004: Temperate regional delivery

Project BS15004 (temperate regional delivery) addresses two of the four desired outcomes of the current 2017-2021 SIP. These two outcomes are:

- Outcome 3: Greater skills, capacity and knowledge in the industry
- Outcome 4: By 2021, at least 90 per cent of growers and other firms involved in the strawberry value chain will be directly engaged with and value national industry services

Project BS15004 is concerned with the delivery of knowledge to strawberry producers in the temperate growing regions of Australia. The temperate production of Australian Strawberries refers to strawberry production in Victoria, South Australia, Tasmania and the southern part of Western Australia. Temperate production contributes on average about 57% of total Australian production of strawberries (see Table 1).

Table 1: Australian Strawberry Production and Value for Years Ending June 2017 to 2020

Year ended June	Total Australian Production (tonnes)	Total Australian Area (ha)	Total Australian Value ($ million)	Total Australian Value ($/tonne)	Total Temperate Production (tonnes)	Temperate production as % Total Production
2017	91,083	2,265	506.5	5,561	n.a.	58.5
2018	93,545	2,796	445.0	4,757	53,321	57.0
2019	76,605	n.a.	392.4	5,122	43,664	57.0
2020	82,310	n.a.	435.0	5,295	46,917	57.0
Average	83,953	n.a.	424.1	5051.6	47,967	57.1

n.a. not available

Source: Australian Horticultural Statistics Handbook, 2017/18. 2018/19 and 2019/20

Project Details

Summary

Project Code: BS15004

Title: *Facilitating the Development of the Australian strawberry industry – temperate regional delivery (Contribution to BS15002 program delivery)*

Research Organisation: Victorian Strawberry Industry Development Committee

Project Leader: Angela Atkinson

Period of Funding: April 2016 to 30 June 2019

Objectives

The broad aim of Project BS15004 was to enhance the adoption of innovation and technology in the temperate growing area of Australia through brokering R&D information and facilitating capacity building. Specific objectives of Project BS15004 were:

1. To identify and prioritise regional issues
2. To develop and deliver 'on the ground technology transfer activities such as workshops and field days
3. To undertake the ongoing management of demonstration sites and grower groups
4. To provide input to information products and communication material developed as part of BS15002
5. To deliver information products and communication material
6. To assist with communication of R&D at a regional level
7. To build networks and contact details for growers and stakeholders in temperate regions
8. To evaluate and feedback to BS15002 and distribute an annual survey of growers and supply chain members
9. To deliver against the annual work plan developed by BS15002 and report to BS15002 against this work plan
10. To make input to the needs analysis and program design developed by BS15002

Logical Framework

Table 2 following provides a detailed description of the project in a logical framework format.

Table 2: Logical Framework for Project BS15004

Activities	Management • The Victorian Strawberry Industry Development Committee (VSIDC) managed the financial administration and reporting for Project BS15004. • A Program Reference Group (PRG) was established by Project BS15002. • Project BS15004 reported to the national oversight project BS15002, providing information as required for milestone reports for the oversight project. Recruitment of the Industry Development Officer • One of the first activities of the VSIDC was, in conjunction with Hort Innovation, to recruit an Industry Development Officer (IDO) to deliver the objectives of Project BS15004, as identified above. Development and Delivery of Activities in Annual Work Plans

	• The VSIDC and IDO worked in collaboration with the national oversight and communications project (BS15002) to develop annual work plans and then deliver the associated specified activities.
	• Such activities included:
	  ○ The identification of industry needs, regional issues and their priorities.
	  ○ The development and delivery of technology transfer activities e.g. workshops, field days, case studies, newsletters, webinars, and other information products.
	  ○ Management of demonstration sites and grower groups in the southern regions.
	  ○ Establishment and management of communities of practice associated with various industry issues (e.g. healthy plant material, biosecurity, fruit fly management waste management).
	  ○ Development of information and communication materials.
	  ○ Communication of R&D outputs to growers.
	  ○ Coordination and facilitation of the annual VSIDC Ladies Dinner.
	  ○ Developing grower and other stakeholder networks.
	  ○ Carrying out annual surveys of temperate growers and supply chain members and reporting of results to Project BS15002.
	  ○ Providing input to the needs analysis and overall program design that was developed by Project BS15002.
	  ○ Participation in PRG meetings.
	  ○ Collation of runner data for temperate grower regions.
	  ○ Provided Input to the mid-term review of BS15002, BS15003 and BS15004.
	  ○ Coordination and facilitation of the BerryQuest International in 2018, held at Launceston, Tasmania.
	
	Monitoring and Evaluation
	  ○ A monitoring and evaluation plan was developed by Project BS15002; the plan was based on a MERL framework (Monitoring, Evaluation, Reporting and Learning).
	  ○ The IDO for BS15004 provided input to the MERL framework.

Outputs	• Industry needs analysis completed. • Relationships developed with other strawberry R&D projects. • Enhancement of regional demonstration sites and case studies, and their ongoing management. • Various articles in industry publications and for the strawberry innovation website; these included 7 grower case studies, 6 fact sheets on production, 4 posters and 3 good practice guides • The development of an Integrated Pest Management Guide. • Improved information products and communication materials delivered to growers including newsletters (e.g. Simply Red, e-Punnet), email updates, posters, and fact sheets (e.g. Good Practice Guide). • Delivery of workshops, farm walks, field days, study tours, seminars, industry forums (e.g. biosecurity), and other technology transfer activities; these communication activities totalled 47 over 4 years (2016-2019). • Update of information products such as National Best Practice Guidelines, the Integrated Pest Management Guide, and a chemical guide. • The delivery of the activities in Project BS15004 has enabled new opportunities for innovation and productivity improvement to be available to temperate strawberry growers.

	• Grower groups and networks established. Additional outputs included: • Strawberry runner data collated for temperate growing regions and provided to Hort Innovation. • Input to the strawberry industry strategic needs analysis. • Reports to Project BS15002 including input to a wider program evaluation. • Contribution to the survey of the extent and severity of Charcoal rot in Victoria.
Outcomes	Intermediate outcomes • Feedback from strawberry growers confirmed that they valued the various communication products, such as the newsletters and email updates. • Increasing interest in new technologies and biosecurity measures has been observed (e.g. an increasing willingness to adopt biosecurity measures on farm). • Skills and knowledge of temperate region producers has increased. Outcomes • A contribution to strawberry industry development in temperate regions. • Increased and improved collaboration between individual growers. • Stronger relationships between elements in the strawberry value chains. • Increased adoption of innovative practices and technologies by strawberry growers. • There was no formal survey to support adoption of improved practices, but all participants in events were asked to complete an evaluation form which included an assessment of their increase in knowledge/understanding, and intention to implement on farm changes (Angela Atkinson, pers. comm., 2021); changes specified included those addressing best practices. • Increased adoption of biosecurity practices and innovative technologies was seen on farm but not officially measured in a specific survey (Angela Atkinson, pers. comm., 2021).
Impacts	• [Economic] Increased productivity and profitability of temperate strawberry growers from innovation, increased adoption of best practice, and more cohesive and efficient strawberry supply chains. • [Social] Regional social impacts may have been derived from increased spillovers to families and businesses in strawberry growing regions from increased grower and supply chain profitability. • [Social] Increased capability and capacity of temperate strawberry growers to change and to further adopt improved practices in future.

Project Investment

Nominal Investment

Table 3 shows the annual investment made in Project BS15004 by Hort Innovation. There was no in-kind financial contribution from the Victorian Strawberry Industry Development Committee or other funding agencies.

Table 3: Annual Investment in Project BS15004 (nominal $)

Year ended 30 June	Hort Innovation ($)	Others ($)	TOTAL ($)
2016	65,000	0	65,000
2017	140,000	0	140,000
2018	140,000	0	140,000
2019	115,306	0	115,306
Totals	460,306	0	460,306

Source: Project Research Agreement (Variation, March 2019)

Program Management Costs

For the Hort Innovation investment the cost of managing and administration of 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 3.

Real Investment and Extension Costs

For purposes of the investment analysis, the investment costs of all parties were expressed in 2019/20 dollar terms using the Implicit Price Deflator for Gross Domestic Product (ABS, 2020). No additional costs of extension were included as the project itself heavily involved the industry and was totally industry oriented.

Impacts

Table 4 provides a summary of the principal types of impacts delivered by the project, based on the logical framework. Impacts have been categorised into economic, environmental and social impacts.

Table 4: Triple Bottom Line Categories of Principal Impacts from Project BS15004

Economic	• Increased productivity and profitability of some strawberry growers in temperate regions derived from increased adoption of best practices and more cohesive and efficient strawberry supply chains.
Environmental	• Potential for some environmental benefits to be captured from more informed use of agrichemicals by temperate strawberry growers.
Social	• Some regional social impacts may have been derived from increased spillovers to families and businesses in temperate strawberry areas from increased grower and supply chain profitability increases. • Increased capability and capacity of temperate strawberry growers to change and to further adopt improved practices in future.

Public versus Private Impacts

The impacts identified from the investment are predominantly private impacts accruing to strawberry growers and their supply chains in temperate strawberry producing regions in Australia. However, some minor public benefits may have been produced in the form of spillovers to regional communities from enhanced grower incomes, and increased supply chain value aligned with the increased value of fresh strawberry production.

Distribution of Private Impacts

The private impacts will have been distributed along the relevant strawberry supply chains. The share of impact realised by supply chain participants will depend on both short-and long-term supply and demand elasticities that are experienced along the various linkages in the supply chains.

Impacts on Other Australian Industries

It is likely that most impacts will be confined to the Australian temperate strawberry industry, including consumers. However, there may have been a marginal contraction in some other horticultural industries due to a marginal increase in strawberry production in temperate Australia.

Impacts Overseas

It is unlikely that there will be any spillover impacts to overseas industries.

Match with National Priorities

The Australian Government's Science and Research Priorities and Rural RD&E priorities are reproduced in Table 5. The project outcomes and related impacts will contribute primarily to Rural RD&E Priority 4, and to Science and Research Priority 1.

Table 5: 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 (2016)

Alignment with the Strawberry Strategic Investment Plan 2017-2021

The strategic outcomes and strategies of the Australian strawberry industry are outlined in the Strawberry Industry's Strategic Investment Plan 2017-2021[1] (Hort Innovation, 2017). Project BS15004 primarily addressed Outcome 3 through:

- Strategy 3.2: Identify the regulatory imposts and those proven technologies and good management practices with greatest impact and ease of implementation to reduce cost of production/increase productivity,
- Strategy 3.4: Continual improvement of integrated pest management (IPM) systems to meet pest and disease threats

Further, BS15004 also addressed Outcome 4 through Strategy 4.1 (Develop an informed and cohesive industry through direct two-way communications with strawberry businesses across Australia) and Strategy 4.2 (Provide timely information on industry production, forecasts and markets).

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

Valuation of Impacts

Impacts Valued

The impact that was valued was the increased productivity and profitability of some strawberry growers in temperate regions due to the investment in Project BS15004. Analyses were undertaken for expected total benefits derived by some strawberry growers and included future expected benefits. A degree of conservatism was used when finalising assumptions, particularly as some uncertainty was involved in the area of temperate strawberry growing that would have been affected. 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.

Impacts Not Valued

Not all of the impacts identified in Table 4 could be valued in the assessment. The potential environmental impact of improved chemical use was not valued largely due to a lack of available information. Also, the regional social impact spillovers were not valued largely due to the difficulty in developing credible assumptions across the various strawberry growing states and regions. Further, the Increased capability and capacity of temperate strawberry growers to change and to further adopt improved practices in future was not valued; however, this impact could be viewed as having contributed to the productivity and profitability impact that was valued.

Summary of Assumptions

The impact that was valued was driven by the assumption of a modest area of temperate strawberry growing that may have been influenced by the project, as well as an assumption of an increase in the associated gross margin for that strawberry area.

The assumptions that have been developed to value the profitability gain are provided in Table 6. The table shows a small proportion of the temperate strawberry area is assumed to be affected, as well as a modest increase in the gross margin.

Table 6: Summary of Assumptions for Impact Valued

Variable	Assumption	Source/Comment
Impact 1: Increased profitability of strawberry growers in Australian temperate regions		
Base data		
Average annual production of Australian strawberries in Temperate Regions	47,967 tonnes per annum	Table 1
Average yield of strawberries in Temperate Regions	35 tonnes per ha	AgriGrowth Tasmania, May 2018
Estimate of area of strawberries in Temperate Regions	1,370 ha	47,967/35
Average gross margin for strawberry production	$76,930 per ha	AgriGrowth Tasmania, May 2018
Project impact assumptions		
Percentage increase in gross margin	5%	Analyst assumption
Proportion of temperate strawberry area assumed impacted	5%	

First year of some impact from Project BS15004	2019	
Years to maximum adoption of practices by growers influenced	4	
Year of maximum adoption	2022	
Risk factors		
Probability of outputs (already delivered)	100%	Analyst assumption
Probability of outcome (adoption by a proportion of temperate strawberry growers)	75%	
Probability of impact (an increase in gross margin, given a successful outcome)	75%	
Attribution to Project BS15004	90%	Analyst assumption; based on some contribution (10%) to the impact valued that was delivered by Project BS15002.

Results

All costs and benefits were discounted to 2019/20 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 (2018/19) as per the CRRDC Impact Assessment Guidelines (CRRDC, 2018).

Investment Criteria

Tables 7 and 8 show the investment criteria estimated for different periods of benefits for the total investment and the Hort Innovation investment alone. As Hort Innovation was the only investor in the project, the investment criteria are the same for both tables.

Table 7: Investment Criteria for Total Investment in Project BS15004

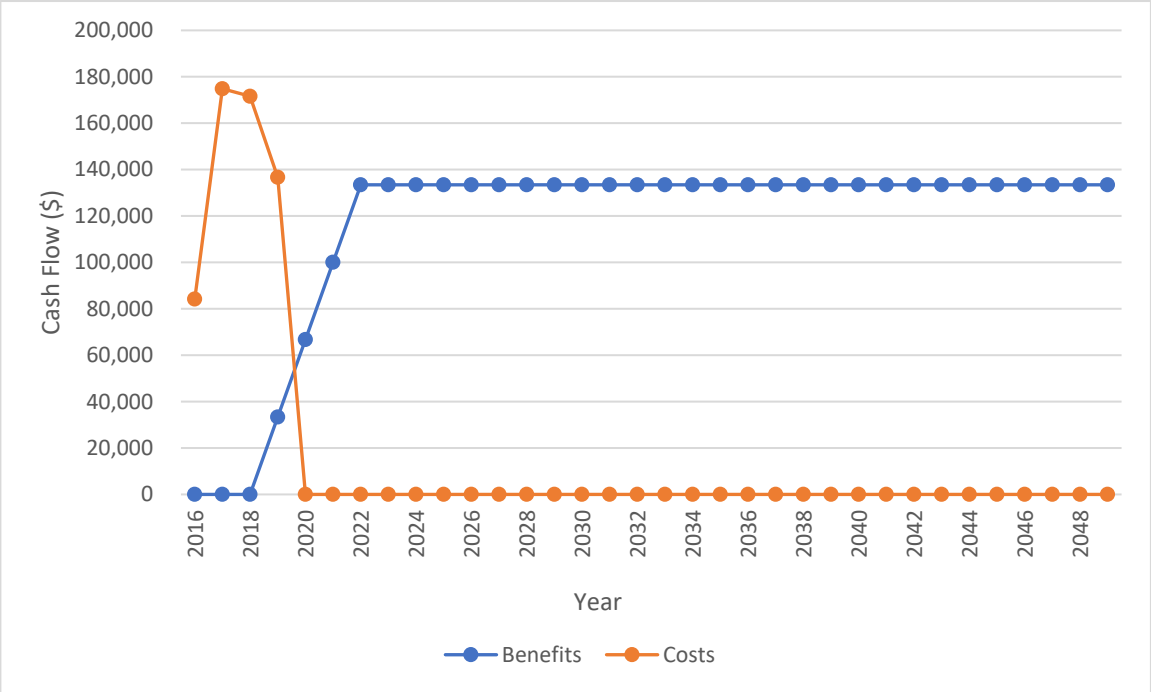
Investment Criteria	**Years after Last Year of Investment**						
	0	**5**	**10**	**15**	**20**	**25**	**30**
Present Value of Benefits ($m)	0.04	0.54	1.02	1.39	1.68	1.91	2.09
Present Value of Costs ($m)	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Net Present Value ($m)	-0.60	-0.09	0.38	0.75	1.05	1.27	1.45
Benefit-Cost Ratio	0.05	0.85	1.60	2.18	2.64	3.00	3.28
Internal Rate of Return (%)	negative	1.3	12.9	15.8	16.8	17.2	17.4
MIRR (%)	negative	0.6	10.9	11.3	10.7	10.1	9.5

Table 8: Investment Criteria for Hort Innovation Investment in Project BS15004

Investment Criteria	**Years after Last Year of Investment**						
	0	5	10	15	20	25	30
Present Value of Benefits ($m)	0.04	0.54	1.02	1.39	1.68	1.91	2.09
Present Value of Costs ($m)	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Net Present Value ($m)	-0.60	-0.09	0.38	0.75	1.05	1.27	1.45
Benefit-Cost Ratio	0.05	0.85	1.60	2.18	2.64	3.00	3.28
Internal Rate of Return (%)	negative	1.3	12.9	15.8	16.8	17.2	17.4
MIRR (%)	negative	0.6	10.9	11.3	10.7	10.1	9.5

The annual undiscounted benefit and cost cash flows for the total investment for the duration of the BS15004 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



Sensitivity Analysis

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 9 presents the results that show a moderately high sensitivity to the discount rate.

Table 9: Sensitivity to Discount Rate
(Total investment, 30 years)

Investment Criteria	**Discount rate**		
	0%	**5%**	**10%**
Present Value of Benefits ($m)	3.94	2.09	1.32
Present Value of Costs ($m)	0.57	0.64	0.71
Net Present Value ($m)	3.37	1.45	0.61
Benefit-cost ratio	6.94	3.28	1.85

A sensitivity analysis was then undertaken for the percentage increase in the proportion of temperate strawberry area assumed impacted by an increase in their gross margin due to the project investment. Results are provided in Table 10.

Table 10: Sensitivity to Percentage Increase in Proportion of Temperate Growers Impacted
(Total investment, 30 years)

Investment Criteria	**Proportion of Temperate Strawberry Growers Impacted by Increase in Gross Margin**		
	2.5 %	**5% (Base)**	**7.5%**
Present Value of Benefits ($m)	1.05	2.09	3.14
Present Value of Costs ($m)	0.64	0.64	0.64
Net Present Value ($m)	0.41	1.45	2.50
Benefit-cost ratio	1.64	3.28	4.92

A sensitivity analysis was then undertaken for the attribution factor assumed for the benefits driven by BS15004. Results are provided in Table 11.

Table 11: Sensitivity to Attribution Assumed to BS15004 (Total investment, 30 years)

Investment Criteria	Attribution Factor		
	75%	90% (base)	95%
Present Value of Benefits ($m)	1.74	2.09	2.21
Present Value of Costs ($m)	0.64	0.64	0.64
Net Present Value ($m)	1.10	1.45	1.57
Benefit-cost ratio	2.73	3.28	3.46

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 12). 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 12: Confidence in Analysis of Project

Coverage of Benefits	Confidence in Assumptions
High	Low- Medium

Coverage of benefits was assessed as High. The most important impact from the investment was valued. The impacts relating to the environment and the regional community spill-overs were not valued. Consequently, the investment criteria as provided by the valued benefits are likely to be marginally underestimated.

Confidence in assumptions for valuation was rated as Low-Medium as many of the assumptions made were not supported by surveys or other forms of evidence of change and had to be made according to the limited relevant evidence available.

Conclusion

Total funding from all sources for the project was $0.64 million (present value terms). The investment produced estimated total expected benefits of $2.09 million (present value terms). This gave a net present value of $1.45 million, an estimated benefit-cost ratio of 3.28 to 1, an internal rate of return of 17.4% and a modified internal rate of return of 9.5%.

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.

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Abbreviations

CRRDC	Council of Research and Development Corporations
DAWR	Department of Agriculture and Water Resources (Australian Government)
IDO	Industry Development Officer
MERL	Monitoring, Evaluation, Reporting and Learning
MIRR	Modified Internal Rate of Return
n.a.	not available
OCS	Office of Chief Scientist, Canberra
PRG	Project Reference Group
R&D	Research and Development
RD&E	Research, Development and Extension
SIP	Strategic Investment Plan
VSIDC	Victorian Strawberry Industry Development Committee