Horticulture Impact Assessment Program:

Appendix 9: Vegnet - Bowen Gumlu & FNQ (VG15004 Impact Assessment)

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Executive Summary

What the report is about

This report presents the results of an impact assessment of a Hort Innovation investment in *VG15004: Vegnet - -Bowen Gumlu &FNQ (Bowen Gumlu Growers Association).* The project was funded by Hort Innovation over the period April 2016 to April 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 project has increased the capacity of vegetable growers in the three Queensland regions to apply knowledge of the application of research and development (R&D) outputs in vegetable production, particularly associated with pest control and export market access. This enhanced capacity by growers has been utilised by some growers, resulting in some practice changes on farm.

The project also has led to an increased appreciation among existing North Queensland and Far North Queensland (FNQ) vegetable growers of the networks and sources of information available to them when considering increasing vegetable production and, potentially, exporting.

Investment Criteria

Total funding from all sources for the project was $0.99 million (present value terms). The investment produced estimated total expected benefits of $1.90 million (present value terms). This gave a net present value of $0.92 million, an estimated benefit-cost ratio of 1.93 to 1, an internal rate of return of 10.8% and a modified internal rate of return of 9.9%.

Conclusions

The investment in VG15004 will likely contribute to improved efficiency of production of vegetable growing in the north, contributing to increased profitability of production by vegetable growers. These increased profits will be shared with those businesses operating supply chains in the north. This combined impact will also lead to spillover impacts to regional communities in three regions in north Queensland (Bowen-Gumlu, the Burdekin and the Atherton Tablelands).

Keywords

Impact assessment, cost-benefit analysis, vegetable industry, Vegnet, IDO

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 impact assessment program MT18011, the first series of impact assessments were conducted in 2019 and included 15 randomly selected Hort Innovation RD&E investments (projects). The second series of impact assessments (current series), undertaken in 2020, also included 15 randomly selected projects worth a total of approximately $7.11 million (nominal Hort Innovation investment). The second series of projects were selected from an overall population of 85 Hort Innovation investments worth an estimated $44.64 million (nominal Hort Innovation investment) where a final deliverable had been submitted in the 2018/19 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 VG15004*: Vegnet - -Bowen Gumlu &FNQ (Bowen Gumlu Growers Association)* 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 fruit and vegetable industry in North Queensland is significant and consists of three major growing regions: Bowen-Gumlu, the Burdekin and Far North Queensland (FNQ).

Bowen-Gumlu is situated in the North Queensland dry tropics. Vegetables and crops produced include, for example. capsicums, chillies, beans, sweet corn, tomatoes, melons, pumpkins, cucurbits, and eggplant. Such crops are valued at $450 m per annum and cover nearly 10,000 ha. Furthermore, there is a large area of additional land also suited to horticulture that could be used to expand horticultural production (including vegetables), but subject to additional access to resources such as irrigation water and labour, and market access.

The Burdekin vegetable area is smaller than Bowen-Gumlu but still has an annual vegetable value of $95 million, grown from a similar range of crops as in Bowen-Gumlu. FNQ fruit and vegetable growing is mainly on the Atherton Tableland where vegetables such as melons, mixed vegetables and pumpkin are farmed with an annual value of about $11.6m.

Under the guidance of the Vegetable Strategic Investment Plan (2012-2017), Hort Innovation funded regional capacity building services concerned with R&D investment, communication of knowledge, enhancing management and business skills, and industry development. Previous Hort Innovation funding addressing these capacity building issues was delivered via AUSVEG, the prescribed peak industry body for the Australian vegetable and potato industries and is the leading horticultural body representing Australian growers.

The Bowen Gumlu Growers Association (BGGA) had completed a number of industry development projects by 2014, before the current project commenced in 2015/16. A large proportion of growers had attended workshops, received information on R&D outputs, integrated pest management and farm management systems.

VG15004 (Vegnet) was one of three Queensland Industry Development Officers (IDOs) funded under the Vegnet initiative; this arrangement provided a support network for the IDOs.

Project Details

Summary

Project Code: VG15004

Title: *Vegnet - -Bowen Gumlu & FNQ (Bowen Gumlu Growers Association)*

Research Organisation: Bowen Gumlu Growers Association Inc.

Project Leader: Cherry Emerick

Period of Funding: April 2016 to April 2019

Objectives

The project aimed to deliver regional capacity building services across the North and Far North Queensland vegetable growing region.

Within this broad aim the specific objectives were:

- To deliver regional capacity building services to the vegetable industry in Bowen-Gumlu and Far North Queensland (FNQ) region.
- To increase knowledge of vegetable R&D and facilitate the adoption of R&D by vegetable businesses in Bowen Gumlu and FNQ.
- To increase the reach of the vegetable R&D program by engaging stakeholders in the vegetable value chain and developing trusted networks at a regional level.
- To provide linkages to the national industry communications services (delivered by AUSVEG through VG15027).
- To provide linkages to the National Vegetable training initiative (VEGPRO VG15028).

Logical Framework

Table 1 following provides a detailed description of the project in a logical framework format.

Table 1: Logical Framework for Project VG15004

Activities	Beginning of project • A monitoring and evaluation plan was developed. • A stakeholder engagement plan was developed including use of websites and facebook, local media articles and local newsletters, emails and other communication channels regarding project events. Activities in Year 1 • An operating plan for year 1 was developed. • A series of workshops was held at Bowen-Gumlu, Burdekin and Mareeba in Year 1 and in following years. • A series of field days were held in the three regions of Bowen-Gumlu, Burdekin and Mareeba. • A series of grower meetings were held in Year 1 (and in each of the following years) within each of the three regions of Bowen-Gumlu, Burdekin and Mareeba. • A number of farm visits by growers and the IDO were undertaken. • A series of factsheets were developed. • The IDO attended various key industry events. • The IDO facilitated a 3 day study tour to South Australia on Precision Agriculture by 8 vegetable growers. • The IDO worked with supply chain infrastructure groups (e.g. Port of Townsville) to identify opportunities for export. • A monthly grower group facilitation exercise (a study group) was planned. • Databases in each of the three subregions were established and/or updated.

	• A monthly newsletter and monthly alerts were developed and actioned. • An initial project survey on the development of RD&E was undertaken. Activities in Year 2 • A second series of 14 workshops was held across the three regions; topics included crop protectant management, export readiness, business management, best management practices and consumer alignment. • A series of 2 field days were completed with IDO facilitation; however, attendance was very low. • A number of meetings were held with growers in each of the three regions. • As for Year 1, a number of farm visits by growers and the IDO were undertaken. • The IDO attended/coordinated/facilitated various key industry events and disseminated information. • The planned monthly study group facilitation did not occur due to lack of interest. • The updating of the grower/stakeholder database for Bowen-Gumlu and the Burdekin were continued and a small database for Mareeba was established. • The monthly newsletter and monthly alerts were continued. • The number of followers on Face Book and Twitter increased significantly and proved to be a valuable resource for up to date information on R&D and other communication material. • An initial project survey to gauge the development of R&D was achieved through the mid-term evaluation and the IDO. Activities in Year 3 and 4 • The IDO continued to provide a wide range of support to vegetable growers across the northern regions, including the facilitation of training and development skills for R&D uptake. • The average number of participants in the workshops held was 12-15 and topics included agrichemical pest management. • Through networking with growers, the IDO identified the need for Hazard Analysis and Critical Control Point (HACCP) training across the three regions and an initial HACCP course was held and attended by 12 growers in March 2018. • The IDO delivered a Biosecurity Farm Planning workshop with the objective of lowering the risk of pest incursions. • The IDO collaborated with other grower groups in Queensland, as well as with Queensland Department of Agriculture officers. • Stakeholder engagement was strengthened by further developing the database of all key vegetable industry stakeholders across the three regions. • The IDO connected growers in FNQ with stakeholders successfully exporting into Singapore as part of Project VG16061. • The potential for joint exporting by growers was explored by the potential appointment of an Export Ready Facilitator in the region. • A trip to South Korea by the IDO established new networks and stakeholders to support growers interested in exporting vegetables. • A collaborative project funded by Austrade delivered targeted training to assist vegetable growers in north Queensland manage the complexities associated with export market access, biosecurity protocols and opportunities in South Korea associated with the recent Free Trade Agreement.
Outputs	• A monitoring evaluation plan and a stakeholder engagement plan were developed and implemented throughout the project. • Databases in each of the three regions were established and/or updated; the databases facilitated communication across stakeholders in the project. • Meetings and workshops were held with grower groups, as well as field days and industry events; these were held in each of the three regions.

	• Various communication methods were utilised in further engaging vegetable growers and value chain stakeholders to consider adopting R&D information and associated increased vegetable production and potential exporting (e.g. methods included newsletters, fact sheets, farm visits, monthly alerts, video conferences, Facebook and Twitter). • Quarterly meetings of the other regional capacity building projects (together forming Vegnet) were held for communication and coordination purposes. • A recommendation was made in the final report that such a project as VG15004 should continue as a full time equivalent and be recognised as a national project and should run for a five year period to maintain continuity. • While the current IDO is employed on a full time basis and is a part of a national project there is still a lot of confusion when the IDO is hosted by a Growers association. • The recommended five year period has not been taken on board at this time (Cherry Emerick, pers. comm., 2020).
Outcomes	• An increase in capacity of vegetable growers in the three regions in knowledge of application of R&D outputs in vegetable production, particularly associated with pest control and export market access. • This enhanced capacity by growers has been utilised by some growers, resulting in some practice changes on farm. • An increased appreciation among existing North Queensland vegetable growers of the networks and sources of information available to them when considering increasing vegetable production and, potentially, exporting. • There was some indication of some diversification to vegetables in the Burdekin region. Some smaller growers have diversified making them less vulnerable to oversupply in one commodity while working towards a more sustainable business in the future. • In order for diversification to strengthen further, there needs to be strong relationships with the growers, the capability and support of networks to ensure that the information received and questions that are asked are answered allowing an informed decision to be made; this may now take time with a new IDO (Cherry Emerick, pers. comm., 2020). • Some changes have been made by stakeholders along the vegetable value chain. • Collaboration has increased between regional groups and national R&D initiatives. • Increased potential for adoption of R&D information and best management practices for vegetable production in the three northern vegetable growing regions based on existing production levels. • A grower cooperative in Mareeba through the IDO and in conjunction with other initiatives commenced export of their produce and doubled their first year's quota the following season and are looking at other possible commodities to export (Cherry Emerick, pers. comm., 2020). • With strong support by the existing IDO and other networks/initiatives that are well planned, export growth should expand across all regions. Bowen has two large corporate growers who are currently exporting and both these growers took advantage of a project to export to South Korea and are now successfully supplying a number of commodities to the South Korean market (Cherry Emerick, pers. comm., 2020).
Impacts	• Potential for increased vegetable production in each of the three regions with associated increased productivity and profitability, and potentially, further increases in vegetable exports through strong support from the existing Industry Development Officer and other networks/initiatives. • It is likely that adoption of best management practices (based on R&D findings) will occur potentially in one (or more) of the three vegetable growing regions in North Queensland (Cherry Emerick, pers. comm., May 2020).

	• However, for this to occur, the delivery and the resource requirements for growers need to be provided by the IDOs via a collaborative approach and not directly delivered by the researchers (Cherry Emerick, pers. comm., 2020). • The IDO role can make an integral contribution to growers operating a sustainable business focusing on best practices, productivity, and profitability. • It is possible that some increased exporting of vegetables will occur as a result of VG15004 , but the individual grower needs to acquire further information and associated networking to that held by the IDO before making such a commitment.

Project Investment

Nominal Investment

Table 2 shows the annual investment made in Project VG15004 by Hort Innovation and others.

Table 2: Annual Investment in Project VG15004 (nominal $)

Year ended 30 June	Hort Innovation	Bowen Gumlu Growers Association Inc. (a)	TOTAL
2016	106,383	44,928	151,311
2017	148,935	62,899	211,834
2018	148,935	62,899	211,834
2019	127,660	53,914	181,574
Totals	**531,913**	**224,640**	**756,553**

Source: Project Research Agreement

(a) A total of $224,640 provided by BGGA as an in-kind contribution from BGGA committee members; this total has been allocated between years in the same proportion as the total Hort Innovation split between years (20%, 28%, 28%, and 24%).

Program Management Costs

For the Hort Innovation investment the cost of managing the 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. The management/administration costs for the in-kind contribution from the BGGA was assumed already included in the costs in Table 2.

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 was already heavily engaged with the vegetable growing industry in North Queensland.

Impacts

Table 3 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 3: Triple Bottom Line Categories of Principal Impacts from Project VG15004

Economic	• Increased potential for adoption of R&D information and best management practices for vegetable production in the three northern vegetable growing regions based on existing levels of production. • Potential for increased vegetable production in each of the three regions with associated increased productivity and profitability, and potentially, further increases in vegetable exports through strong support from the existing Industry Development Officer and other networks/initiatives.
Environmental	• Potential for improved environmental outcomes by improved control of pests.
Social	• Potential spillovers to some North Queensland regional communities from increased profitability of vegetable growing.

Public versus Private Impacts

The impacts identified from the investment will be predominantly private impacts accruing to vegetable growers. However, some of these impacts will be gained by the local communities via spillovers from increased vegetable grower incomes.

Distribution of Private Impacts

The private impacts will be distributed between vegetable producers and entities along their value chains in accord with the corresponding short- and long- term supply and demand elasticities experienced by entities along each value chain.

Impacts on Other Australian Industries

It is likely that most positive impacts will be mostly confined to the northern vegetable industry with some potential negative impacts on existing land uses (e.g. sugarcane producers in the Burdekin); the extent of these impacts will depend on the magnitude of any potential increase in vegetable production and exports.

Impacts Overseas

It is unlikely that there will be any significant spillover impacts from the project to overseas interests, except that countries such as South Korea may benefit from any potential future vegetable exports from north Queensland (e.g. via seasonality and price).

Match with National Priorities

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

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 Vegetable Industry Strategic Investment Plan 2017-2021

The strategic outcomes and strategies of the Australian vegetable industry are outlined in the Vegetable Strategic Investment Plan 2017-2021[1] (Hort Innovation, 2017). Project VG15004 addressed primarily Outcome 3 (increased farm prodductivity) via Strategies 3.2, 3.4 and 3.8. Also, the project addressed Outcome 5, via most strategies listed in the Plan (e.g. Strategies 5.1, 5.2, 5.3 and 5,4). To some extent, Project VG15004 also addressed Outcome 2 via Strategies 2.2, 2.3, 2.5 and 2.7.

[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

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.

Impacts Not Valued

Not all of the impacts identified in Table 4 could be valued in the assessment. The impact of increased regional community spillovers was not valued largely due to lack of data to support credible assumptions. The potential for improved environmental outcomes by improved control of pests was not valued for similar reasons.

Summary of Assumptions

The impact that was valued was the increase in profit for those North and Far North Queensland vegetable producers due to the investment in Project VG15004.

The assumptions that have driven the potential increase in profits for North and FNQ vegetable producers are provided in Table 5. The assumption table shows a small proportion of growers are assumed to have improved their management and increased vegetable production resulting in an increase in profit from 2020/21.

Table 5: Summary of Assumptions for Impact Valued

Variable	Assumption	Source/Comment
Base vegetable production data		
Value of vegetable production in Bowen-Gumlu region	$450 m per annum	Project proposal
Value of vegetable production in the Burdekin region	$95 m per annum	
Value of vegetable production in the Atherton Tableland region	$11.6 m per annum	
Impact of Project VG15004 via an increase in the gross value of production		
Proportion of current production in all three regions subject to increase due to Project VG15004	10%	Analyst estimate
Increase in gross value for those increasing production	5%	
Farm business profit as % of farm cash receipts	10.7%	Average of three years (2016-17, 2017-18 and 2018-19) ; ABARES (2019)
Year of first impact (year ending June)	2021	Analyst estimate
Year of maximum impact (year ending June)	2025	
Risk and attribution factors		
Probability of output	100%	Analyst estimate
Probability of outcome (change in production-(adoption)	80%	
Probability of impact (profit)	80%	
Attribution	75%	In recognition of other projects making some contribution to the outcome.

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 6 and 7 show the investment criteria estimated for different periods of benefits for the total investment and the Hort Innovation investment alone.

Table 6: Investment Criteria for Total Investment in Project VG15004

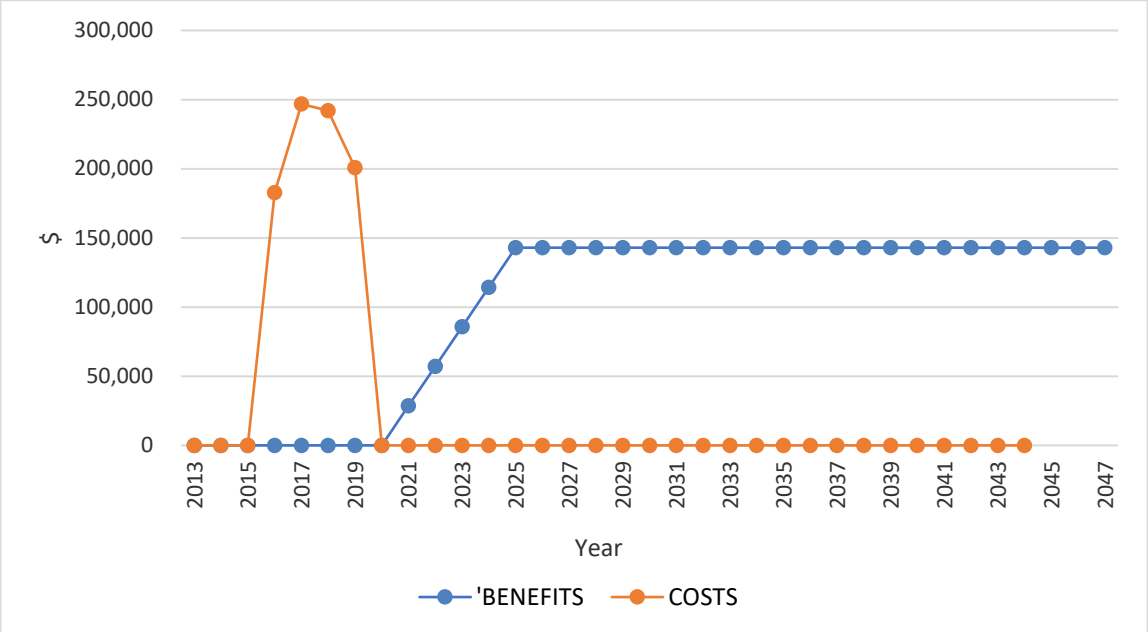
Investment Criteria	Years after Last Year of Investment						
	0	5	10	15	20	25	30
Present Value of Benefits ($m)	0.00	0.25	0.76	1.16	1.47	1.71	1.90
Present Value of Costs ($m)	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Net Present Value ($m)	-0.99	-0.74	-0.23	0.17	0.48	0.73	0.92
Benefit-Cost Ratio	0.00	0.25	0.77	1.17	1.49	1.74	1.93
Internal Rate of Return (%)	negative	negative	1.7	6.6	8.6	9.5	10.8
MIRR (%)	negative	negative	2.0	6.2	7.2	7.4	9.9

Table 7: Investment Criteria for Hort Innovation Investment in Project VG15004

Investment Criteria	Years after Last Year of Investment						
	0	5	10	15	20	25	30
Present Value of Benefits ($m)	0.00	0.18	0.55	0.84	1.07	1.25	1.39
Present Value of Costs ($m)	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Net Present Value ($m)	-0.72	-0.54	-0.17	0.12	0.35	0.53	0.67
Benefit-Cost Ratio	0.00	0.25	0.77	1.17	1.49	1.74	1.93
Internal Rate of Return (%)	negative	negative	1.7	6.6	8.6	9.5	9.9
MIRR (%)	negative	negative	2.0	6.2	7.2	7.4	9.9

The annual undiscounted benefit and cost cash flows for the total investment for the duration of the VG15004 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 8 presents the results that show a moderately high 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 ($m)	3.86	1.90	1.10
Present Value of Costs ($m)	0.87	0.99	1.11
Net Present Value ($m)	2.99	0.92	-0.01
Benefit-cost ratio	4.42	1.93	0.99

A sensitivity analysis was then undertaken for the proportion of production in all three regions that sustains a production increase due to the project. Results are provided in Table 9. The break-even proportion of current production that increases due to the project investment is estimated at 5.2%

Table 9: Sensitivity to Proportion of Vegetable Growers Sustaining a Production Increase (Total investment, 30 years)

Investment Criteria	Proportion of Growers Sustaining a Production Increase		
	2.5%	10% (Base)	15%
Present Value of Benefits ($m)	0.48	1.90	2.86
Present Value of Costs ($m)	0.99	0.99	0.99
Net Present Value ($m)	-0.51	0.92	1.87
Benefit-cost ratio	0.48	1.93	2.90

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 10). 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 10: Confidence in Analysis of Project

Coverage of Benefits	Confidence in Assumptions
Medium-High	Low

Coverage of benefits was assessed as Medium-High. The most important impact (the increase in grower profits was valued. The impacts relating to increased regional community spillovers and the potential improved environmental outcomes were not valued. Consequently, the investment criteria as provided by the valued benefits are likely to be underestimated.

Confidence in assumptions for valuation was rated as Low as some of the assumptions made were not supported by surveys or other forms of evidence and had to be made according to the limited evidence produced by the project and the analyst's experience (e.g. risk parameters).

Conclusion

The investment in Project VG15004 is likely to contribute to an increased value of vegetable production in North and FNQ due to increased uptake of R&D information and potentially, increased vegetable exports in the forthcoming years.

Total funding from all sources for the project was $0.99 million (present value terms). The investment produced estimated total expected benefits (increased profits) of $1.90 million (present value terms). This gave a net present value of $0.92 million, an estimated benefit-cost ratio of 1.93 to 1, an internal rate of return of 10.8% and a modified internal rate of return of 9.9%.

As two of the identified impacts were not valued, the investment criteria estimated by the evaluation may have somewhat underestimated 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.

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Abbreviations

BGGA	Bowen Gumlu Growers Association
CRRDC	Council of Research and Development Corporations
DAWR	Department of Agriculture and Water Resources (Australian Government)
FNQ	Far North Queensland
GDP	Gross Domestic Product
GVP	Gross Value of Production
HACCP	Hazard Analysis and Critical Control Point
IDO	Industry Development Officer
IRR	Internal Rate of Return
MIRR	Modified Internal Rate of Return
OCS	Office of Chief Scientist Queensland
PVB	Present Value of Benefits
R&D	Research and Development
RD&E	Research, Development and Extension
IRR	Internal Rate of Return
MIRR	Modified Internal Rate of Return
OCS	Office of Chief Scientist Queensland
PVB	Present Value of Benefits
RD&E	Research, Development and Extension