

Horticulture impact assessment program 2020-21 to 2022-23 (MT21015)

Annex 13: Impact assessment of the project *Table grape export readiness and market access* (TG17000)

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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 *TG17000 Table grape export readiness and market access*. The project was funded by Hort Innovation over the period December 2017 to December 2020.

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 2020-21 dollar terms and were discounted to the year 2020-21 using a real (inflation-adjusted), risk free, pre-tax 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 Hort Innovation investment in Project TG17000 contributed to a range of activities for export market development and support. Activities included providing information and assistance to key stakeholders facilitating market access and hosting inspectors and contributing to discussion around protocol change. Many activities were conducted with table grape growers that facilitated export registrations and built the industries capacity to comply with export protocols. The key impact that was valued was, *The Australian table grape industry can sustainably increase production due to increased export demand and improved market access for producers*. The impact was valued by applying a gross margin to a portion of increased exports over the project period and tapering off (residual benefit) after the project period.

The impacts identified but not value were:

- [Economic] Maintenance of existing export markets via relationship management
- [Economic] Grower cost saving in the facility export registration process, attributable to the projects roll out of ATGA registration software
- [Social] Increased capacity and understanding of export markets and trade negotiation
- [Social] Increased contribution to regional community socio economic wellbeing from an expanding table grape industry

Investment criteria

Total funding from all sources for the project was \$1.6 million (2021 equivalent value). The investment produced estimated total expected benefits of \$26.7 million (2021 equivalent value). This gave a net present value of \$25.1 million, a benefit-cost ratio of 17.1 to 1, a VERY high internal rate of return and a MIRR of 21%.

Conclusions

Hort Innovation, the research and grower representative were all consistent in their comments that the project did not just grow markets, but also help maintain existing markets. Were some of the value from existing markets to be attributed to the project, the economic benefit would be much higher.

Keywords

Impact assessment, cost-benefit analysis, table grape, export, market access

Introduction

Evaluating the impacts of levy investments is important to demonstrate to levy payers, Government and other industry stakeholders the economic, social and environmental outcomes of investment for industry, as well as being an important step to inform the ongoing investment agenda.

The importance of ex-post evaluation was recognised through the Horticulture Innovation Australia Limited (Hort Innovation) independent review of performance completed in 2017 and was incorporated into the Organisational Evaluation Framework.

Reflecting its commitment to continuous improvement in the delivery of levy funded research, development and extension (RD&E), Hort Innovation required a series of impact assessments to be carried out annually on a representative sample of investments of its RD&E portfolio. The assessments were required to meet the following Hort Innovation evaluation reporting requirements:

- Reporting against the Hort Innovation's 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 for each Hort Innovation industry fund.
- Annual Reporting to Hort Innovation stakeholders.
- Reporting to the Council of Rural Research and Development Corporations (CRRDC).

As part of its commitment to meeting these reporting requirements, Ag Econ was commissioned to deliver the *Horticulture Impact Assessment Program 2020-21 to 2022-23 (MT21015)*. This program consisted of an annual impact assessment of 15 randomly selected Hort Innovation RD&E investments (projects) each year.

Project *TG17000 Table grape export readiness and market access - ATGA* was randomly selected as one of the 15 investments in the 2020-21 sample. This report presents the analysis and findings of the project impact assessment.

General method

The 2020-21 population was defined as an RD&E investment where a final deliverable had been submitted in the 2020-21 financial year. This generated an initial population of 175 Hort Innovation investments, worth an estimated \$101.14 million (nominal Hort Innovation investment). The population was then stratified according to the Hort Innovation RD&E research portfolios and five, pre-defined project size classes. Projects in the Frontiers Fund, and those of less than \$80,000 Hort Innovation investment being removed from the sample. From the remaining eligible population of 59 projects, with a combined value of \$39.51 million, a random sample of 15 projects was selected worth a total of \$9.7 million (nominal Hort Innovation investment), equal to 25% of the eligible RD&E population (in nominal terms).

The impact assessment followed 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 included both qualitative and quantitative descriptions that are in accord with the impact assessment guidelines of the CRRDC (CRRDC, 2018).

The evaluation process involved reviewing project contracts, milestones, and other documents; interviewing relevant Hort Innovation staff, project delivery partners, and growers and other industry stakeholders where appropriate; and collating additional industry and economic data where necessary. Through this process, the project activities, outputs, outcomes, and impacts were identified and briefly described; and the principal economic, environmental, and social impacts were summarised in a triple bottom line framework.

Some, but not all, of the impacts identified were 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 and rationale

Industry background

In 2020-21, the Australian table grape industry included approximately 1000 growers across Australia (Hort Innovation 2022a). Most growers were small to medium sized family-owned businesses with only a few large growers. Victoria accounted for 78% of production, NSW 10% and QLD, WA & SA less than 5% each. Around 71% of production was exported (Hort Innovation 2022b).

Despite a decrease in production and prices as a result of the COVID-19 disruption, table grape production volume and value grew strongly during the project period (2017-18 to 2020-21), with 5-year trend production growth of 5% and value growth of 8%. The strong growth in production was supported by similarly strong growth in export volumes, with trend growth of 7% per year from 2017-18 to 2020-21 (Hort Innovation 2022b).

Producers in the table grape industry pay levies to the Department of Agriculture, Fisheries and Forestry (DAFF), who is responsible for the collection, administration and disbursement of levies and charges on behalf of Australian agricultural industries. Levy is payable on table grapes that are produced in Australia and either sold by the producer or used by the producer in the production of other goods. Hort Innovation manages the table grape levy funds which are directed to R&D and marketing.

Rationale

The table grape industry's levy investments are guided by a Strategic Investment Plan (SIP). The Table grape SIP 2017-21 (under which TG17000 was delivered) identified customer demand as a key outcome, more specifically 'identify and develop new and existing export market opportunities' additionally 'support demand-building activities in export and domestic markets', were a top priority for Australia's table grape industry. Maintaining and growing export demand is essential in an industry that risks domestic over supply in peak season each year.

In line with the SIP, TG17000 aimed to continue supporting Australian table grape export market access and maintenance. The project followed TG14000 *Market Access, Maintenance, Biosecurity and Developing Export Markets Development* (2014-2017) and was followed by TG20000. TG17000 was implemented to achieve the following objectives:

- Develop industry preparedness and vigilance in strictly adhering to export protocols
- Address the need to increase export opportunities
- Build on previous industry successes in the area of market access, market improvement and market maintenance
- Ensure consistency with industry's export strategies for 2014-2019.

Alignment with the Table Grape Strategic Investment Plan 2017-2021

With a focus on export markets, TG17000 was closely aligned to the Outcome 1 – Increased demand for Australian table grapes by strengthening and developing domestic and export market opportunities that will improve industry viability and sustainability.

Alignment with national priorities

The Australian Government's National RD&E priorities (2015a) and Science and Research Priorities (2015b) are reproduced in Table 1. The project outcomes and related impacts will contribute to RD&E Priority 4, and to Science and Research Priority 1.

Table 1. National Agricultural Innovation Priorities and Science and Research Priorities

Australian Government	
National RD&E Priorities (2015a)	Science and Research Priorities (2015b)
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.

Project details

Summary

Table 2. Project details

Project code	TG17000
Title	<i>Table grape export readiness and market access</i>
Research organization	Australian Table Grape Association
Project leader	Jeff Scott
Funding period	December 2017 – December 2020

Logical framework

A logical framework is shown in Table 3 to highlight the connection between the project activities, outputs, outcomes, and impact.

Table 3. Project logical framework

Activities	<ul style="list-style-type: none"> • Stakeholder communication and engagement • Establishment of the skills based Market access export advisory committee to assist with priority development and annual work plans based on the industries market access strategies (Table Grape Export Strategic Plan 2014-2019) • Market access coordination, meetings and workshops • Provided advice and ensured collaboration with industry and key stakeholders who facilitate market access for table grape exports.
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	<ul style="list-style-type: none"> • Built and maintained relationships with key export stakeholders in export markets (including activities such as participation in industry trade delegations and trade fair, conference and seminar participation as well as in and out bound trade missions). • Hosting Korean inspectors and participating in meetings with the aim to change inspection protocols. • Contributed to Hort Innovations table grape industry Export Strategy and Market Development programs. • Conducted export market research on priority markets. • Facilitated auditing of (10) export facilities with Thai inspectors • Grower activities. • Provided input into industry training, quality standards and protocol improvement. • Facilitated industry registration via the development of software encompassing DAWE registration tools. • Coordinated DAWE internal audits of grower export facilities. • Developed industry resources and tools to support growers access table grape export markets (I,e development of on-line export manual). • Ran industry workshops to assist understanding of export market conditions, market opportunities and protocol requirements. • Coordinated grower meetings with importers, distributors and retailers at international trade shows.
Outputs	<ul style="list-style-type: none"> • Establishment of a skilled market access export advisory committee. • Improved protocols for Korean, Indian, Thai and New Zealand export markets. • Industry market strategy for China, Japan and Korea developed, including establishment of export pathways. • Administration and roll out of the export facility registration software (that captures DAWE registration and mapping). • Industry resources and tools to support export market access (assisting the grower process of external audits) i.e updated online export manual. • Weekly export market reports distributed to growers. • Articles within the VINE magazine and other publications. • Conducted annual trade seminars in Korea, Japan, The Philippines, Thailand, Vietnam and Indonesia. • Grower workshops and seminars (attendance /participation increased 35% each year).
Outcomes	<ul style="list-style-type: none"> • Improved export market access and conditions across a number of markets – Increasing product demand, enhanced protocols and improved compliance for: <ul style="list-style-type: none"> ○ Korea: improved inspection rates ○ India: accepting in-transit cold treatment for fruit fly ○ Japan: Advanced negotiations re: varieties allowed into Japan ○ Thailand: Advanced negotiations re: post harvest irradiation, support of on-shore treatment facilities (10 facilities audited) ○ New Zealand: Accepted x-ray irradiation ○ Vietnam: Advanced negotiations on acceptance of x-ray irradiation ○ Indonesia: Continued recognition of export status with audits every 1-2 years ○ USA: Advanced negotiations for removal of fumigation / on-shore treatments. • Generally maintained relationships with key export markets. • Expanded export opportunities for growers who hadn't previously exported (due to decreased export barriers and increased information / tools). • Streamlined grower registration (rolling out ATGA developed software). • Increased participation in Chinese, Thai, Philippine, and Vietnamese export markets (attributable to increased facility registrations by 15%). • Improved grower input into (ATGA) export market development and problem solving. • Improved grower knowledge around protocol requirements such as maximum residue limits (MRL) ensuring increased protocol compliance. • Earlier and increased registration of export facilities.

	<ul style="list-style-type: none"> Improved growers' confidence that export demand will support industry production growth.
Impacts	<ul style="list-style-type: none"> [Economic] The Australian table grape industry can sustainably increase production due to increased export demand and improved market access for producers [Economic] Maintenance of existing export markets via relationship management [Economic] Grower cost saving in the facility export registration process, attributable to the projects roll out of ATGA registration software [Social] Increased capacity and understanding of export markets and trade negotiation [Social] Increased contribution to regional community socio economic wellbeing from an expanding table grape industry

Project costs

Nominal investment

Table 4. Project nominal investment

Year end 30 June	Hort Innovation (\$)	Other (\$)	Total (\$)
2018	264,970	0	264,970
2019	522,071	0	522,071
2020	243,558	0	243,558
2021	150,564	0	150,564
Total	1,181,163	0	1,181,163

Program management costs

R&D costs should also include the administrative and overhead costs associated with managing and supporting the project. The Hort Innovation overhead and administrative costs were calculated for each project funding year based on the data presented in the *Statement of Comprehensive Income* in the *Hort Innovation Annual Report* for the relevant year. Where the overhead and administrative costs were equal to the total expenses, less the research and development and marketing expenses. The overhead and administrative costs were then calculated as a proportion of combined project expenses (RD&E and marketing), averaging 16.1% for the TG17000 funding period (2018-2021). This figure was then applied to the nominal Hort Innovation investment shown in Table 4.

Real Investment costs

For purposes of the investment analysis, the investment costs of all parties were expressed in 2020-21 dollar terms using the Implicit Price Deflator for Gross Domestic Product (ABS, 2022).

Extension costs

Communication and extension were conducted within the project, so the project expenditure is assumed to be inclusive of extension costs.

Valuation of impact

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 valued

The impact valued was:

- [Economic] The Australian table grape industry can sustainably increase production due to increased export demand and improved market access for producers

The impact was valued by applying a gross margin to a portion of increased exports over the project period and tapering off (residual benefit) after the project period.

Impacts not valued

Not all of the impacts identified in Table 3 could be valued in the assessment due to a lack of data making it difficult to quantify the causal relationship and impact pathway. The impacts identified but not value were:

- [Economic] Maintenance of existing export markets via relationship management.
- [Economic] Grower cost saving in the facility export registration process, attributable to the projects roll out of ATGA registration software.
- [Social] Increased capacity and understanding of export markets and trade negotiation.
- [Social] Increased contribution to regional community socio economic wellbeing from an expanding table grape industry.

Public versus private impacts

The impacts identified from the investment are predominantly private impacts accruing to table grape growers. However, some public benefits also have been produced in the form of capacity built and spill-overs to regional communities from enhanced grower income.

Distribution of private impacts

This analysis quantified private benefits accruing to table grape growers. Additional spill over private impacts would be generated in the wider economy. Increased farm input costs resulting from increased production would result in spill over changes increased income for businesses providing those goods and services. The total private impacts will have been further redistributed between growers, processor/packers, wholesalers, exporters, and retailers depending on both short- and long-term supply and demand elasticities.

Impacts on other Australian industries

Findings from the project were explicit to the table grape industry.

Impacts overseas

International collaboration has resulted in the increasing the proportional supply of Australian table grapes into overseas markets. This may influence the demand or supply from other markets.

Data and assumptions

A summary of the key assumptions made in the assessment is provided in Table 5.

Table 5. Summary of assumptions for impact valuation

Variable	Assumption	Source / comment
Discount rate	5%	CRRDC impact assessment guidelines
Table grape exports (t) without project	106,666	Hort Stats Handbook 2016-17 export volume (Hort Innovation 2022b)
Average table grape exports (t) during project	136,419 (± 15%)	Hort Stats Handbook exports during TG17000 project years 2017-18 to 2020-21 (Hort Innovation 2022b), assuming flat exports in 2022 (based off export data to May 2022 (Trademap 2022)) and return to trend growth of 7% per year from 2023 (Hort Innovation 2022b).
Real farm gate price (\$/kg)	\$3.4 /kg (± 5%)	Inflation adjusted Hort Stats Handbook 4-year average (TG17000 project years 2017-18 to 2020-21) and standard deviation (Hort Innovation 2022b)

Income benefit. Farm gross margin (% of gross income) associated with export	20% (\pm 40%)	Developed through discussion with J Scott & P Brancatisano. Gross revenue of approximately \$31/box (9.2 kg * farm gate price). Production and export sale costs totaling \$25 /box. Equals \$6/box gross margin = 20% return on gross income.
Adoption costs	Nil \$	Cost of exports are considered within farm gross margin %
Engagement with table grape exporters	60% (\pm 33%)	TG17000 Final Report showed that 370 to 440 growers attended the yearly workshops, equal to approximately 41% of total growers (lower bound). Assuming participating growers accounted for the majority an upper bound of 80% was applied, with an average of 60%.
Attribution of outcome (increased exports)	70% (+14% & 71%)	70% based of discussion with stakeholders who were consistent in their views about the extent to which this project (including the relationships developed and maintained by project staff) underpinned export market growth & maintenance. Project expenditure was 20% of SIP export priority funds (Hort Innovation 2021) so was applied as a lower bound, with 80% assumed as max.
R&D counterfactual	70% (\pm 30%)	Exports remain a priority for other investors however, the key outcome of TG17000 involved the engagement of exporters industry-wide, which was considered more likely to be achieved with levy funding through Hort Innovation. As such, it was assumed that 70% of the benefits would not have occurred without Hort Innovation funding of this project.
Duration of benefits	7 years (\pm 2 years) from 2018	Benefits started immediately at commencement of the project. Year 1 benefits were assumed as 20% of the total benefit as the project started half way through the year, so the increase in exports for that season are more likely to be associated with the spillover benefits of the previous project (TG14000). Residual benefits were assumed to continue beyond the end of the end of the project declining to zero after 3 years (tested at 1 year and 5 years), reflecting the potential for rapidly changing export market conditions.

Results

All costs and benefits were discounted to 2020-21 using a real 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 (2020-21) as per the CRRDC Impact Assessment Guidelines (CRRDC, 2018).

Investment criteria

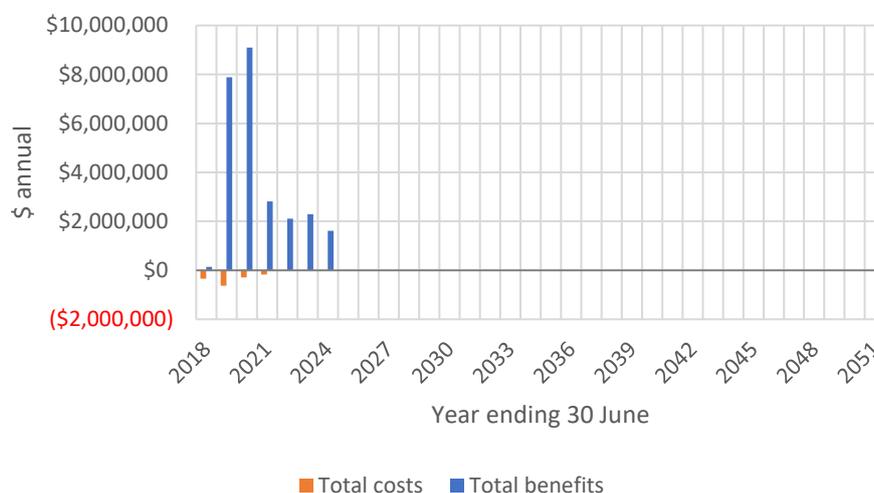
Table 6 shows the impact metrics estimated for different periods of benefit for the total investment. Hort innovation funded 100% of the project.

Table 6. Impact metrics for the total investment in project TG17000

Impact metric	Years after last year of investment						
	0	5	10	15	20	25	30
PVC (\$m)	1.56	1.56	1.56	1.56	1.56	1.56	1.56
PVB (\$m)	21.22	26.70	26.70	26.70	26.70	26.70	26.70
NPV (\$m)	19.66	25.14	25.14	25.14	25.14	25.14	25.14
BCR	13.56	17.06	17.06	17.06	17.06	17.06	17.06
IRR	3808%	3808%	3808%	3808%	3808%	3808%	3808%
MIRR	370%	90%	51%	37%	29%	24%	21%

Figure 1 shows the annual undiscounted benefit and cost cash flows for the total investment in TG17000. Cash flows are shown for the duration of the investment plus 30 years from the last year of investment.

Figure 1. Annual cash flow of undiscounted total benefits and total investment costs



Sensitivity analysis

A sensitivity analysis was carried out on key variables identified in the analysis where a data range was identified, or there was a level of uncertainty around the data (Table 7). Data ranges and sources are described in Table 5.

Table 7. Impact BCR sensitivity to changes in key underlying variables

Variable		Low	Baseline	High
Discount rate	Variable range	2.5%	5%	7.5%
	BCR range	17.56	17.06	16.59
Table grape farmgate price (\$/kg)	Variable range	\$3.2	\$3.4	\$3.6
	BCR range	16.15	17.06	17.96
Gross margin revenue (% of revenue)	Variable range	12%	20%	28%
	BCR range	10.23	17.06	23.88
Duration of residual benefits (years)	Variable range	1	3	5
	BCR range	14.41	17.06	20.91
Attribution of outcome (increased exports) to TG17000	Variable range	20%	70%	80%
	BCR range	4.87	17.06	19.49
R&D counterfactual	Variable range	50%	70%	90%
	BCR range	11.94	17.06	22.17

Discussion and conclusions

The analysis has shown that the investment into TG17000 has generated benefits far greater than the project cost, with a BCR of 17.06:1.

The impact quantified was the projects contribution to increased export demand and improved market access for table grape producers allowing the industry's overall production to sustainably grow. The impact was valued by attributing the gross margin for 70% of export growth over the project period. The Chinese, Thai, Philippine and Vietnamese markets saw considerable growth during the project period however the project also conducted work across a range of other markets including Japan, Korea, India, New Zealand, Indonesia and USA. Hort Innovation, the research and grower representative were all consistent in their comments that the project did not just grow markets, but also help maintain existing markets. If some of the pre-project export value was attributed to the project, the economic benefit would be much higher.

Sensitivity testing of the key variables resulted in BCRs ranging from 4.9 to 23.9. All variables tested returned a positive project impact. The results were most sensitive to the attribution of the outcome (increased exports) to the project, and the gross margin achieved on the increased production supported by the project.

Additional benefits were identified that were not able to be quantified due to a lack of data but which have the potential to generate value above that calculated in this analysis, these were:

- [Economic] Maintenance of existing export markets via relationship management
- [Economic] Grower cost saving in the facility export registration process, attributable to the projects roll out of ATGA registration software
- [Social] Increased capacity and understanding of export markets and trade negotiation
- [Social] Increased contribution to regional community socio economic wellbeing from an expanding table grape industry

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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.
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.

Abbreviations

CRRDC Council of Rural Research and Development Corporations

DAFF Department of Agriculture, Fisheries and Forestry (Australian Government)

GDP Gross Domestic Product

GVP Gross Value of Production

IRR Internal Rate of Return

MIRR Modified Internal Rate of Return

PVB Present Value of Benefits

PVC Present Value of Costs

RD&E Research, Development and Extension

SIP Strategic Investment Plan