AGRICULTURAL DEVELOPMENT FUND

SUPPORTING INFORMATION

The instructions for completing the Agricultural Development Fund Grant Application Form are provided in blue text within the form itself. This document provides additional information, context and worked examples and should be read in conjunction with the Guidance for Applicants document, available at www.dpipwe.tas.gov.au/ADF.

If further assistance is required to complete the application form after reading this information, please contact Farmpoint in the first instance:

FarmPoint
Phone: 1300 292 292
Email: Farmpoint@dpipwe.tas.gov.au

Topics in this document

1. Checklist of information to provide

After reading your application, the assessment panel should know:

- The objectives of the project and what problem it will solve
- How the project proposes to solve the problem
- How industry is collaborating on the project
- The potential benefits from the project
- Who will benefit from the project
- The steps that need to happen to achieve on-farm adoption and realise the benefits of the project
- Which of these steps will be undertaken as part of the project
- What needs to happen after the project to achieve on-farm adoption and realise the benefits of the project
- What critical dependencies are required for the project to achieve its intended outcomes
- How your project design will achieve or promote the achievement of on-farm adoption and realisation of benefits

2. *Do I need to complete a cost-benefit analysis?*

It is acknowledged that a rigorous cost-benefit analysis is often not technically feasible or may require expertise that is not available or is too costly.

However, successful application will:

- Use readily available data and information to provide a credible indication of the potential benefits of the project, quantified where possible
- Enable the panel to understand what additional steps and investment (if any) will be required to deliver the proposed benefits
- Demonstrate how the project design will help maximise the potential benefits from the investment (grant)
- Communicate clearly in a way that enables comparison with other proposals

For project seeking in excess of $500,000 in funding, a rigorous economic impact analysis must be submitted. The following section provides some information about types of economic, environmental and social impacts.

Support is available if you have questions about what is required or need assistance with identifying economic, environmental and social impacts and can be accessed by contacting Farmpoint.

3. *Examples of economic, environmental and social impacts*

Potential sources of economic benefits include:

- productivity gains due to
    - increased yield and/or reduced yield losses
    - increased product value due to quality improvements
    - reduced production costs
    - production and supply chain efficiencies due to improved managerial systems and information
- improved market outcomes
    - improvements in industry knowledge and communications resulting in improved response to market conditions
    - improved market access (including export markets)
    - production processes that increase consumer acceptance of product (e.g. improved animal welfare, carbon emission profile)
    - development of new products to create new market opportunities and/or revenue streams
- reduction in financial risk
- enhance productive capability of resource asset (e.g. soil)
- spill-over impacts in other industries (e.g. application of technology in another sector)

Potential sources of environmental impacts include:

- changes in use of pesticides and chemicals (including fertilisers)
- changes in carbon emissions or sequestering of carbon
- mitigation of natural hazards
- changes energy efficiency and consumption

- changes in water efficiency and consumption
- changes in water, air or land quality
- reduction of waste
- increased biodiversity

Potential social benefits include:

- Improved work health and safety
- Improved public health and mental health
- Increased employment in regional communities
- Increased resilience of regional communities
- building innovation skills for other industries
- indigenous culture and heritage
- increased human capital
- increased social cohesion

4. Do you have any worked examples?

A worked example is provided overleaf for the hypothetical development of mechanically-assisted cherry harvesting.

Steps to on-farm impact

The steps to on-farm impact for this proposal are shown in Figure 1. There is more than one way that the project could be designed and two possibilities are presented to illustrate this. The variations are intended to illustrate the potential impact of project design on adoption rates and impact.

The steps to realisation of benefits are the same for all three projects. The group of steps undertaken within the project is indicated by the size (width) of the dark blue text box. The arrow to the right of each 'project box' indicates the steps that need to occur after project completion and the intensity of the colour of the arrow indicates how the design of the project is expected to impact the realisation of the benefits of the project. A darker coloured arrow indicates greater impact on realisation of benefits.

Example responses

In the example, two projects with slight variations in design are outlined with information aligned to the ADF Grant Application Form and hypothetical application responses for each project are shown in Table 1.

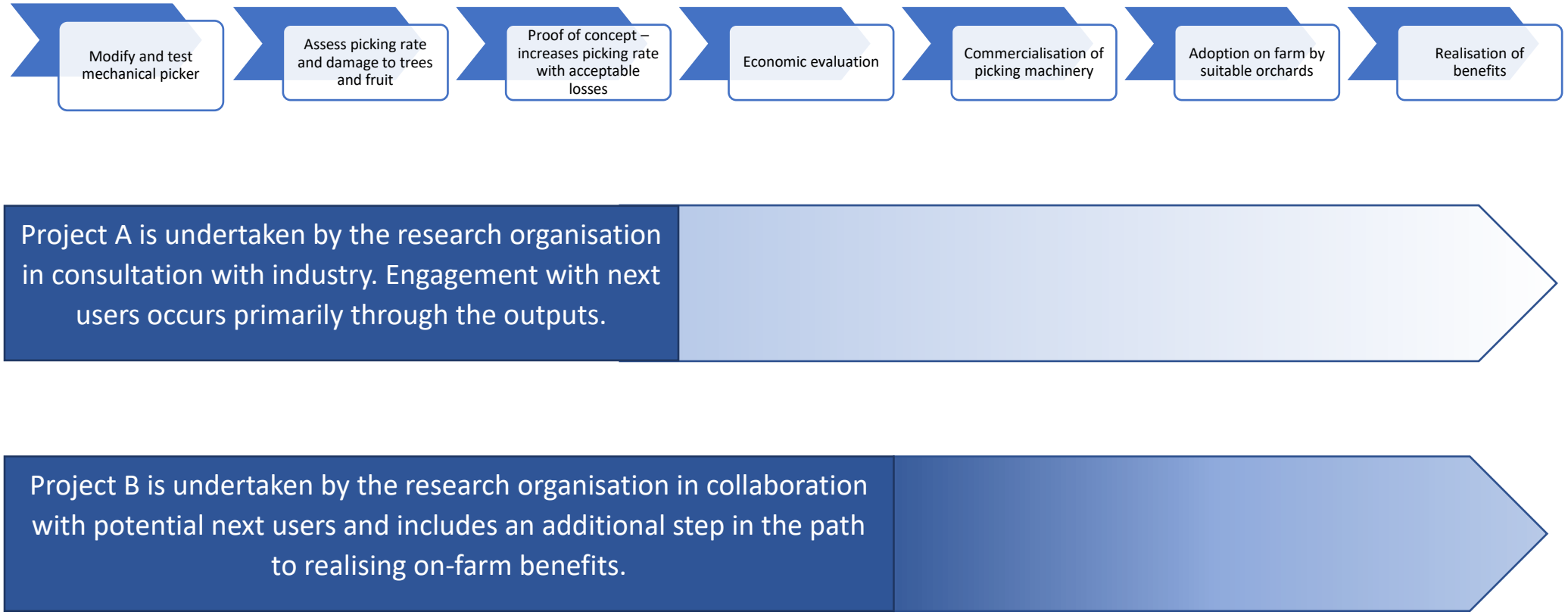
The examples are provided in order to demonstrate the type of information and thought processes required when completing the application form, and should not be viewed as a feasible or realistic project, or the type of proposal that would be likely to attract funding from the ADF.

Because the example given here is hypothetical and over-simplified, it lacks specific detail; applications would be expected to include additional and more robust information about problem definition, methods, experimental design, reviews of existing work etc, using the recommended word limits in in the Grant Application Form as a guide. You are encouraged to attach additional documents as required to provide supporting evidence.

All values and figures are for illustration only.

5. *Example of steps to on-farm impact*

Figure 1. Mechanical Cherry Picking Project – steps to on-farm impact



6. *Simplified examples of application responses*

Table 1: Simplified example application responses for two projects to develop mechanical cherry harvesting systems

	Project A	Project B
Project title	Mechanical cherry picking A	Mechanical cherry picking B
Short project summary (for public release)	Developing a methodology for mechanical cherry picking with analysis of fruit quality and impact on trees	Developing a methodology for mechanical cherry picking with analysis of economic impact, including fruit quality and impact on trees
Industry partner	Bing's cherry orchard	Fruit Growers Tasmania (FGT)
Research partner	Tasmanian Institute of Agriculture (TIA)	Tasmanian Institute of Agriculture (TIA)
Principal Investigator	Dr Jerry Picker	Dr Jerry Picker
Other partners		• ACME picking technology (a multinational company) • Local agribusiness consultancy which provides the cherry industry with economic analysis and commercial extension services • Local cherry orchards
Other project team members	• N.G. Neer, agricultural engineer • Ivan Expert • Min Yans	• N.G. Neer, agricultural engineer • Ivan Expert • Min Yans
Primary administrative contact	xxx	xxx
Funds requested	$200,000	$250,000
Proposed start date	01/11/2021	01/11/2021
Proposed end date	01/03/2023	01/06/2023

B1. Problem Statement and project objectives	Access to sufficient appropriate seasonal labour is an ongoing challenge for the $X million cherry industry, particularly in view of the closure of international borders during the COVID-19 pandemic. In addition, costs associated with labour represent approximately Y% of most producers' input costs. Therefore, the ability to improve harvest efficiency represents an opportunity for significant cost savings for cherry producers and improved long term viability.	Access to sufficient appropriate seasonal labour is an ongoing challenge for the $X million cherry industry, particularly in view of the closure of international borders during the COVID-19 pandemic. In addition, costs associated with labour represent approximately Y% of most producers' input costs. Therefore, the ability to improve harvest efficiency represents an opportunity for significant cost savings for cherry producers and improved long term viability.
B2. Industry support and engagement	Dr Picker has approached Bing's cherry orchard to secure access for conducting the trials.	Industry has raised the need to mitigate the risks associated with securing seasonal work through FGT, who have in turn discussed an approach to addressing the issue with the research partner, Dr Picker and other project team members.
B3. Reviews	Mechanical harvesting is routinely used for walnuts where efficiency gains of X% are reported. Other trials in X, Y and Z crops have also been undertaken with results showing promising results. One trial of mechanical cherry harvesting was conducted in xxxx, but since this time, technology has improved, and it is anticipated that the problems associated with fruit damage that were reported in this trial have been addressed.	Mechanical harvesting is routinely used for walnuts where efficiency gains of X% are reported. Other trials in X, Y and Z crops have also been undertaken with results showing promising results. One trial of mechanical cherry harvesting was conducted in xxxx, but since this time, technology has improved, and it is anticipated that the problems associated with fruit damage that were reported in this trial have been addressed.
B4. Relevance to Agricultural Development Fund	*This project is provided as an example only and is not necessarily well-aligned with the funding priorities and assessment criteria of the ADF.*	*This project is provided as an example only and is not necessarily well-aligned with the funding priorities and assessment criteria of the ADF.*
C1. Industry collaboration	• Project steering committee includes an FGT representative • Sections of a number of commercial cherry orchards are leased or provided as in-kind contribution to undertake the trials.	• Lead industry proponent is FGT • Project partner is ACME picking technology (manufactures the equipment that is to be adapted) • Participatory research in which the trials are undertaken on commercial orchards in partnership with the business.
C2. Project activities	This project will involve the development of a system for mechanically harvesting cherries using a shake-and-catch system. It will involve the following components: *1. Optimisation of harvest system* The first stage of this project will involve the modification and optimisation of a mechanical walnut harvesting machine	This project will involve the development of a system for mechanically harvesting cherries using a shake-and-catch system. It will involve the following components: *1. Optimisation of harvest system* The first stage of this project will involve the modification and optimisation of a mechanical walnut harvesting machine

for use with cherry trees. This will entail adjustments to the machine's shaking frequency, modifications to the device which grasps the trunk/limbs, development of a system for catching the fruit in a way that minimises damage, and assessment of cherry trees for damage during testing. It will also involve the development of a system for efficiently moving the harvesting system between trees and optimising its use for different tree architectures.

2. *Fruit quality assessment and characterisation of trees*
A protocol for evaluating harvested fruit quality will be developed. This will involve a standardised method for assessing characteristics such as pedicel retention, splitting, bruising and shelf-life. We will also define and characterise traits that may impact on mechanical harvest efficiency, including pedicel fruit retention force for different varieties, tree age, and tree architecture.

3. *Field evaluation*
Four different varieties (Burlat, Van, Lapin and Sweetheart) will be harvested from trial sites across ten different locations using the mechanical system, with hand-picking at the same locations for comparison. Harvest rate (kg fruit picked per worker per hour) will be made for both hand-picked and mechanically harvested fruit, and the harvested products will be evaluated for quality using the quality assessment protocol. Harvested trees will be assessed for damage, fruit removal efficiency will be determined, and wastage (i.e. fruit on the ground) will be quantified.

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3. *Field evaluation*
Four different varieties (Burlat, Van, Lapin and Sweetheart) will be harvested from trial sites across ten different locations using the mechanical system, with hand-picking at the same locations for comparison. Harvest rate (kg fruit picked per minute) will be made for both hand-picked and mechanically harvested fruit, and the harvested products will be evaluated for quality using the quality assessment protocol. Harvested trees will be assessed for damage, fruit removal efficiency will be determined, and wastage (i.e. fruit on the ground) will be quantified.

4. *Economic analysis*
Economic analysis of the data will be undertaken by a consultant to the local industry to assess the profitability of mechanical picking taking into account the increase in fruit harvested per worker per hour, the economic losses due to downgrading/damage to fruit and damage to trees. The overall impact on the industry is also estimated, taking into account suitable tree architecture and orchard layout.

C3. Outputs	• Mechanical modification and methodology for picking cherries • Protocols for evaluating impact of mechanical harvest on fruit quality and damage to trees • Data on picking rates and impact on fruit and trees • Identification of suitable tree architecture and orchard layout Above information shared via the following methods: • Demonstration day • Reports to grantor and industry partners • Fact sheets	• Mechanical modification and methodology for picking cherries • Protocols for evaluating impact of mechanical harvest on fruit quality and damage to trees • Data on picking rates and impact on fruit and trees • Identification of suitable tree architecture and orchard layout • Economic Analysis of the optimal mechanised method of picking Above information shared via the following methods: • Collaborative engagement with industry partners • Demonstration day • Reports to grantor and industry partners • Fact sheets
C4. Potential outcomes	A mechanical method of harvesting is identified that: • Increases the harvest rate per hour per worker by x% from a to b • Results in fewer than y% of fruit being downgraded • Results in minimal/acceptable damage to trees, soil and other resources on which production is dependent.	A mechanical method of harvesting is identified that: • Increases the harvest rate per hour per worker by x% from a to b • Results in fewer than y% of fruit being downgraded • Results in minimal/acceptable damage to trees, soil and other resources on which production is dependent. • Will result in an estimated increase in net return of $x per tonne of fruit picked for suitable orchards
C5. Steps to achieving on-farm impact	Assuming that C4 is achieved, the following steps need to occur after completion of the project to realise the benefits outlined of the project: • Economic analysis by next user to guide decision making. • Development and commercialisation of modified mechanical harvester • Cherry producers with suitable tree architecture choose to invest in or lease mechanical harvesting equipment • Producers use the technology effectively and efficiently • Over time, new plantings accommodate the latest mechanical harvesting technology These steps are beyond the scope of the project. It is anticipated that if successful, market forces will result in	Assuming that C4 is achieved, the following steps need to occur after completion of the project to realise the benefits outlined of the project: • Development and commercialisation of modified mechanical harvester – promoted by involvement of potential commercialisation partners in project and funding of economic analysis • Cherry producers with suitable tree architecture choose to invest in or lease mechanical harvesting equipment – promoted by availability of economic analysis, partnering with commercial extension provider and agribusiness adviser already servicing the industry • Producers use the technology effectively and efficiently – promoted by partnering with commercial extension

	commercialisation and promotion by the equipment manufacturer to industry advisers and growers.	provider and agribusiness adviser already servicing the industry • New plantings accommodate the latest mechanical harvesting technology – promoted by availability of economic analysis, increased certainty of commercialisation, and partnering with commercial extension provider and agribusiness adviser already servicing the industry
C6. Adoption	Estimate that 35% of all cherry producers adopt the technology after 10 years. Assumptions: • Commercialisation partner is found within 2 years of project completion • Commercial production of modified picker occurs commences 4 years after project completion • 50% of existing orchards are suitable for use of technology • On-farm adoption commences 5 years after project completion and gradually increases over the following 5 years. • 50% of suitable orchards adopt the technology within 10 years of project completion • 90% of new plantings are designed to suit technology from year 6 after project completion (ie at year 10 they are still non-bearing)	Estimate that 60% of all cherry producers adopt the technology after 10 years. Assumptions: • ACME proceeds with an economic analysis and then commercialisation on project completion • Commercial production of modified picker occurs 1 year after project completion • 50% of existing orchards are suitable for use of technology initially, rising to 60% by year 10 due to new plantings coming into production. • On farm adoption commences 3 years after project completion and gradually increases over the following 8 years. • 90% of suitable orchards adopt the technology within 10 years of project completion. • 90% of new plantings are designed to suit technology from year 2 after project completion
C7. Economic impacts	• Decreased exposure to labour supply risks and increased resilience of businesses • An increase in the net revenue per tonne of cherries produced. 2018-19 cherry production was approximately 4,500 tonnes. Under the assumptions of C6, a constant cherry production volume and a discount rate of 7%, the benefits at 10 years will exceed the costs (break-even) if net revenue is increased by $75 per tonne cherries harvested.	• Decreased exposure to labour supply risks. • An increase in the net revenue per tonne of cherries produced. 2018-19 cherry production was approximately 4,500 tonnes. Under the assumptions of C6, a constant cherry production volume and a discount rate of 7%, the benefits at 10 years will exceed the costs (break-even) if net revenue is increased by $28 per tonne cherries harvested. • Increased profitability of cherries as crop may result in expansion of cherry production with an overall increase in productivity per hectare
C8. Environmental impacts	• None anticipated	• None anticipated

C9. Social benefits	• Possible improvement in viability of cherry businesses increasing regional community resilience • Improved WHS	• Likely improvement in viability of cherry businesses increasing regional community resilience • Improved WHS
C10. Assumptions	• Assumptions already addressed in C6 and C7.	• Assumptions already addressed in C6 and C7.
C11. Intellectual Property	• The IP associated with proposed mechanical cherry harvester will reside with the research organisation, with the intention that they would work with a commercialisation partner to develop the system and make it available on a commercial basis to cherry producers.	• The IP associated with proposed mechanical cherry harvester will reside with ACME, but the system to be developed will be made available on a commercial basis to cherry producers.
C12. Risks and risk management	*For example:* • Unforeseen technical issues that prevent adaptation of the machinery for these purposes. It is anticipated that these issues will be avoided due to the research organisation's strong track record and experience in this area. • Low uptake of technology. The anticipated success of this technology based on similar experiences in similar orchard systems provides confidence that this is likely to be an attractive system for commercial providers and farmers given sufficient time.	*For example:* • Unforeseen technical issues that prevent adaptation of the machinery for these purposes. It is anticipated that these issues will be avoided due to ACME's direct experience in modifying mechanical harvesters for different crop types for commercial applications. • Low uptake of technology. The strong partnership with a commercial extension provider and agribusiness adviser, combined with a robust economic analysis that provides certainty to farmers regarding the benefits of the technology will mitigate this risk.