Cooperative Research Centres (CRC) Program Round 25 Application Stage 2 Impact Tool User Guide

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1.   Introduction

The Impact Tool is an essential part of your CRC Round 25 Stage 2 application. It shows the pathway from inputs to impact for each Research Program and the CRC as a whole. Key aspects:

- Demonstrating links between CRC research, planned outcomes and overall objectives
- Identifying risks and mitigation strategies
- Calculating Benefit:Cost Ratios.

The Impact Tool can help you verify your Research Programs and projects are structured correctly. It is important to maintain consistency between the Impact Tool and the rest of your Stage 2 application. It can assist you to:

- Comprehensively articulate the path from research activity through to monetary and non-monetary impacts
- Identify all relevant risks and mitigation strategies on the path to impact
- Clearly display linkages between Research Programs and projects
- Justify expected usage costs and impact benefits
- Identify and justify a range of expected non-monetary impacts.

The CRC Advisory Committee (the Committee) recognises the difficulty in determining accurate projected monetary values for usages and impacts. Assessment and analysis will therefore focus on your identified pathway from inputs to impacts, along with your justification for values provided.
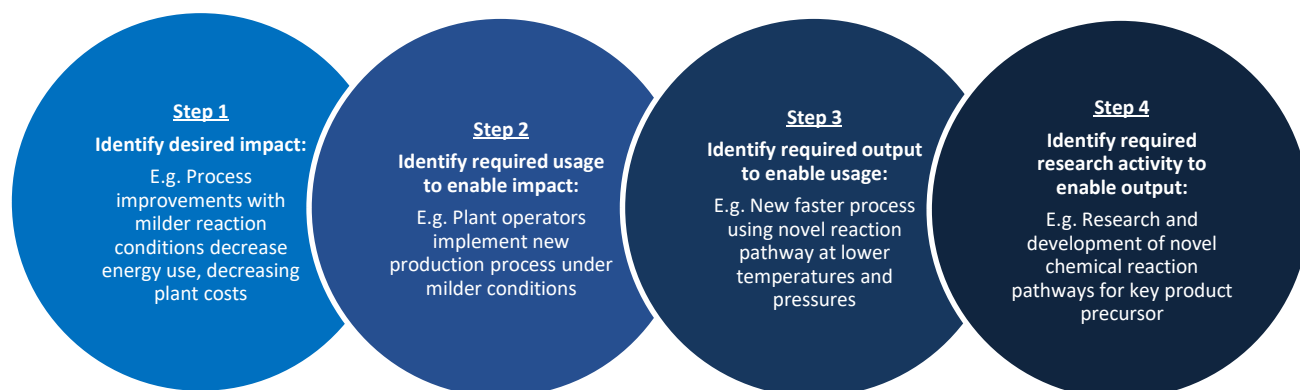
If you are successful, your Impact Tool will support development of your Grant Agreement Milestones as included in the Stage 2 Budget and Milestones Spreadsheet. Clearly articulated, measurable and achievable outputs and usages can significantly simplify this process.

You are not expected to include every possible activity, output, usage and impact you hope to deliver in the Impact Tool. The proposal is limited to 5 Research Programs and you may include up to 5 key activities, outputs, usages and impacts per Research Program.

2.   The Impact Pathway

Before you fill out the Impact Tool, read this guide and the CRC Round 25 Grant Opportunity Guidelines. Plan your Research Programs strategically with your partners and key CRC personnel to achieve the highest possible impacts (both monetary and non-monetary). This should include a strong industry component to ensure research translation.

It can help to map your impact pathway in reverse (example below), starting from desired impact, to usages enabling the impact, then outputs required for that usage and finally the research activities towards that output. Each activity and resulting output(s) should have intended usages resulting in impacts. Further details on what constitutes a research activity, output, usage or impact is provided in Sections 4.1–4.4 of this guide. A flowchart structure of the Impact Tool is shown at Attachment A.

Step 1
Identify desired impact:
E.g. Process improvements with milder reaction conditions decrease energy use, decreasing plant costs

Step 2
Identify required usage to enable impact:
E.g. Plant operators implement new production process under milder conditions

Step 3
Identify required output to enable usage:
E.g. New faster process using novel reaction pathway at lower temperatures and pressures

Step 4
Identify required research activity to enable output:
E.g. Research and development of novel chemical reaction pathways for key product precursor

As you develop your impact pathway, you should identify risks associated with each step and consider appropriate mitigation strategies. It is also important to include evidence in your application to demonstrate impact achievements are feasible in your planned timeframe. If an impact is not likely to occur due to unmitigated high risks and/or poor alignment with your overall application, this could impact Committee recommendations.

Your impact pathway outlines your CRC's planned research translation towards quantified outcomes, including commercialisation, end user involvement, industry uptake and community benefits. The Impact Tool focuses on monetary impacts in this pathway. You should also identify potential non-monetary impacts for each Research Program in the Impact Tool and in your response to assessment criteria.

Links between Research Programs and impacts in the application should align with links outlined in your Impact Tool. Some CRCs will have multiple links between interdependent Research Programs and others will have links solely within each Research Program. This will depend on your CRC's planned objectives and outcomes. You should ensure your governance and management approach is appropriate for your planned structure.

3.   Using the Impact Tool

The Impact Tool is available from business.gov.au. You must submit it with your Stage 2 application.

1.   Fill in the detail for each Research Program in the RP tabs, with any further required information on CRC impacts in the Additional Information Tab.
2.   In the Project Overview Tab, input basic information for all Research Programs.
3.   The Benefit Cost Calculator and Summary Tabs compile key information for review.

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3.1 Project Overview Tab

Fill out this tab once all other tabs have been completed to ensure consistent information. Enter your CRC name, application number (from the business.gov.au portal) and Research Program titles. For each Research Program, detail expected costs/contributions, partner involvement and categorised expenditure Totals should align with your Stage 2 Budget and Milestones Spreadsheet. Summarise key activities, outputs, usages and impacts. The "Total resource" for each Research Program should equal the Total Inputs for that Research Program on the relevant RP tab.

All monetary values, key activities, key outputs, key usages and key impacts requested refer only to each specific Research Program. CRC resources (cash and in-kind) not fitting within a specific Research Program should be allocated proportionally across the Research Programs in the Impact Tool. The total of all programs in the Impact Tool should match total CRC resources in the Stage 2 Budget and Milestones Spreadsheet.

3.2 Research Program (RP) Tabs

The key detail of your Research Programs in terms of monetary inputs, research activities, outputs, usages and impacts (monetary and non-monetary) are included in these tabs. Only enter information in years the CRC will be active and grant funds are being requested. Once values are entered into relevant fields, a Net Present Value (NPV) will be automatically calculated for the Research Program input costs, usage costs and impact benefits. The Impact Tool NPV provides a value today for an amount to be received or expended in the future using an assumed discounted rate of five percent per annum.

If an activity, output, usage or impact is not needed leave the rows blank. If needed, further information can be entered in the Additional Information tab. You should cross reference material to appropriate places in the preceding tabs.

3.3 Benefit:Cost Calculator Tab

This tab provides the monetary benefit:cost ratio of each Research Program and the overall projected monetary benefit:cost ratio for your CRC. The quality and rigour of your analysis undertaken to determine benefits and costs remains the key focus, rather than the numbers alone.

The forward estimate of research impacts is understood to be a rough estimate only. However, the final value should be realistic to your sector and demonstrate sufficient planning to project the gross impact of your CRC.

The overall typical expected return (accounting for risks and time value of money) on public funded R&D, over a fifteen year time period, is around $1 - $3 of net benefits per $1 of resources allocated. If your projections are significantly higher than this, you will require strong supporting evidence. You should not attempt to skew relevant inputs, costs, risks and other factors to fit within the expected return range as it may vary depending on your specific CRC, sector and objectives.

3.4 Summary Tab

This tab collates information from the previous tabs for clear display. The pathway from activities to impacts is included along with risks of non-achievement at each stage. It can assist you to focus mitigation strategies by identifying areas of higher risk.

4. RP Tabs (1-5) In Detail

The Total Inputs over all years should equal the total grant funds, partner and other contributions (cash and in-kind) allocated to the Research Program.

4.1 Activities

Briefly outline key research activities for each Research Program, aligning with your responses to the application assessment criteria. Include a separate research activity for the education and training component of each Research Program. This may include a PhD program, training initiatives and industry placements of students.

4.2 Outputs

Outputs are the desired project outcomes that enable usage by relevant partners. For example, if an anticipated usage is take-up of a new technology produced by the CRC, the related output would be production of the technology. Output descriptions should also align with your application assessment criteria. The Impact Tool also requires the activity number(s) the output relies on. An output can rely on multiple research activities, across Research Programs, or only one activity.

Your CRC outputs will depend on your impact pathway. Examples include: products, processes, trials, prototypes, technologies, publications, patents, training packages, PhD completions, SME or international engagement. Consider whether the output is achievable during the CRC timeframe. For example, if an output requires a number of clinical trials prior to final product release, you should include their duration in the critical path for the related impact. All outputs must occur during the life of the CRC.

Your responses should be easily understood without expert knowledge and demonstrate the output is measurable and achievable in the given timeline. You should provide sufficient detail in the output description and annual timeline of key milestones to explain key development stages. This may not require detail in every year of the timeline depending on the specific output. However, you should demonstrate sufficient consideration and planning towards your intended outcomes. Providing only one milestone in the timeline, or repeating the same milestone multiple times, may suggest poor planning.

4.3 Usages

Usage refers to the uptake, application or adoption of outputs by industry and/or other relevant end-users. End-users may be commercial users, community organisations, government or individuals. Some usages may require several outputs (including outputs from across multiple Research Programs), or a single output may have multiple usages. Consider:

- Who will use the output(s)
- How the user is related to the CRC
- How output(s) will be connected to the usage
- What the user will require to refine/adopt/apply the output(s).

Usages must be realistic both in the CRC timeframe and with your collaborating partners. Usages and impacts that do not result from CRC activities or that rely on non-partner entities must not be included. For example, if you propose to develop a new product used by companies from a sector not participating in your CRC, there is a high risk usage will not occur without clear commitment from relevant end-users.

The timeline of key usage milestones should include clear, factual and measurable descriptions for key milestones associated with the delivery and progress of each usage. Expected usage should be realistic with milestones included in all relevant years. There may be a lag between developing outputs and the actual adoption or application of these outputs by end-users.

A common mistake is the difference between usages and outputs. Usage is a result of an output produced by the CRC. For example:

Output	Usage
New production process developed based on research conducted by CRC	New process implemented by relevant businesses in the industry
Innovative software created for real-time monitoring	Mining companies install new technology using developed software
10 PhD students complete training through CRC	10 students employed by industry
Evidence based report developed by CRC	Government department bases policy changes on evidence presented in report
Training packages developed by CRC	Training conducted by relevant community organisations

4.3.1   Usage costs

Usage costs should include time, effort and resources required for end-users to adopt the output(s). Do not include input costs associated with developing the related output(s). Accurate usage cost estimation requires industry sector knowledge and end-user engagement to determine and justify their costs. Clarify whether the output end-user needs to further develop, market test or trial the output prior to it being a final output ready for sale, distribution or application. If so, the usage costs may be significantly higher than the costs incurred by the CRC in producing the original output.

Only include usage costs relating to the desired impacts. For example, only include the production costs incurred by an industry partner to the point where associated monetary returns will be realised. If a usage results from outputs across multiple Research Programs, split the usage cost across these Research Programs proportionally to output significance. Usage costs should be provided in the same years as key usage milestones.

4.4 Impacts

Consider the relationship between usages and impacts for each Research Program. More than one usage may be required for an impact to occur, which may be across multiple Research Programs. Similarly, a usage may produce more than one impact. Non-monetary impacts for each Research Program are detailed after monetary impacts.

4.4.1   Monetary impacts

Describe key monetary impacts for each Research Program. Include the details and quantification of impact scale and how this was calculated. Impacts may include productivity gains, industry development, environmental improvements and health and social benefits. These are not always easy to quantify financially. You should consult with end-users and access existing data sources to best quantify and justify your impact values. The focus is on the overall process, not the final numbers in isolation.

Monetary benefits should typically be expressed in terms such as cost reductions for government, profit increases for business, or increased lifetime consumption possibilities for individuals. Each of these benefits are broadly comparable as they each increase consumption possibilities. Assign these benefits to the allocated time period, up to 15 years from the first year of your CRC.

Monetary benefits are economic valuations. Where there is a health, social, environmental or community benefit, these impacts may be expressed economically. For example, improved health outcomes often translate to lower health costs and improved workforce participation rates can be attached to a dollar value. Further, preservation of the environment may enable sustainable tourism, improved social cohesion may facilitate lower crime rates and in turn lower costs in the criminal justice system.

Impacts need to be generally measurable and accountable to the CRC. For example, the 'implementation of a new process in hospitals will reduce the government's expenditure on health care by five percent' is a very broad impact. It could be achieved by many initiatives coinciding with the CRC. It would be difficult to associate this with the CRC's activities alone and therefore attribute the impact to CRC outputs. An appropriate impact description could be 'implementation of new process in hospitals will reduce required in-hospital patient care, resulting in five percent efficiency savings for participating hospitals'.

It is unlikely all impacts will be completely attributable to usages of the CRC's outputs. You should acknowledge other factors that will likely contribute to an impact and transparently account for these as much as possible. For example, if the CRC is one of three key equal contributors to an impact, enter a third of the monetary value of the total net impact when completing the impacts tab.

The impact value should be the net benefit rather than the gross benefit recorded if access to the benefit involves costs beyond usage costs above. For example, a new diagnostic test may involve access costs to the patient. The net benefit is the value of the gaining better health outcomes minus the patient cost for test access. The gross benefit is the value of the health benefits alone. In this example, the test access cost may be another impact example, The producer of the test may gain a net benefit of the income received for the test, minus the cost to the provider of supplying the test.

4.4.3   Non-monetary impacts

CRCs often generate considerable non-monetary impacts. Describe these clearly at the end of each Research Program tab. For example, a new lifesaving medical approach is a non-monetary benefit. Consider what is valued by society for your non-monetary impacts. This may include better health, social connections, a sense of security, environmental quality or other similar benefit.

Non-monetary impacts may link to monetary impacts or may be completely independent. Where the non-monetary impact is related to a monetary impact, note this in your response.

4.5 Risk Ratings

Select each risk rating from 'Very Low', 'Low', 'Medium', 'High' to 'Very High'. Consider the indicators in Section 5 below and the Research Program tabs content. High risk activities can be associated with high returns, however higher risk ratings require strong mitigation strategies.

The risk rating is proportional to the event **not** occurring. 'Very Low' is a very high probability of success, 'Very High' is a very low probability of success. The Impact Tool will automatically calculate risk-adjusted NPVs for usage costs and impact benefits based on the risk ratings selected:

Risk rating	Very low	Low	Medium	High	Very high
NPV calculation probability of success	95%	75%	50%	25%	5%

Resulting costs and benefits in the Research Program and Benefit:Cost Calculator tabs will be approximate only. As noted in Section 3.3, the primary focus is your understanding of expected usages and impacts, associated planning and a general indication of the expected Research Program return.

5. Risk Rating Indicators

5.1 Usages: Risk that required outputs are NOT produced

Risk Indicator	Very Low	Low	Medium	High	Very High
Researcher output delivery track record	Very strong	Strong	Moderate	Limited	None (early stage?)
Degree of project specific management risk	Very low	Low	Some	High	Very high
Effective partner collaboration track record	Very strong	Strong	Some	Poor/Low influence	None/No influence
Delivery success of output in research field	Almost certain	Likely	Possible	Unlikely	Rare
Output addition to existing knowledge	Minor	Incremental	Significant	Innovative	Pioneering
Usage reliance on first mover advantage	None	Limited	Beneficial	Critical (group)	Critical (individual)
Known competitors with similar agenda	Limited	Few	Some	In progress	Many in progress
Competitor stage comparison with CRC	Much less advanced	Less advanced	Less advanced	Comparable	More advanced
Competive advantage in CRC area	Absolute	Distinct	Some	Limited	Minimal
Impact of partner/key personnel loss	None	Minimal	Output delays	Significant delays	Output ceases
Partner/key personnel replaceable	Yes	Yes	Yes	Unlikely	No

5.2 Usages: Risk that usage does NOT occur once outputs are produced

Risk Indicator	Very Low	Low	Medium	High	Very High
Research usage in relevant field	Very common	Common	Not uncommon	Few examples	None
Researcher track record of end-user output adoption	Substantial	Sound	Some	Limited	None
Engagement track record with CRC end-users	Strong	Good	Some	Limited	None
CRC end-users as involved CRC partners	Majority	Most	Some	Limited relationship	No relationship
Distribution channel capability detail	Strong	Clear	Included	Limited	Yet to be developed
Distribution channel current state	Existing	Existing	Existing	Partial existence	Does not exist
Potential use of distribution channels	Incentivised	Useable	Possible	To be developed	To be established

5.3 Impacts: Risk of usages NOT occurring to enable impact

Risk Indicator	Very Low	Low	Medium	High	Very High
Probability of usages occurring to enable impact	>95%	>75% to 95%	25% to 75%	5% to <25%	<5%

You must calculate the "probability of usages occurring to enable impact" using the formula below:

*(Probability that all required outputs ARE produced)×(Probability that all required usages DO occur once outputs are produced) = **Probability of usages occurring to enable impact***.

This risk is a result of the combined usages risks associated with the impact. List all usages associated with the impact then convert their two associated risks to probabilities: Very Low Risk = 95% probability; Low Risk = 75% probability; Medium Risk = 50% probability; High Risk = 25% probability; Very High Risk = 5% probability. For each usage required for impact, multiply the two probabilities together for an individual **Overall Usage Probability**. If multiple usages are required, multiply their overall probabilities together for the combined **probability of usages occurring to enable impact**. For example, if usages 1.01, 1.04 and 2.01 are required for impact 1.01:

Usage	1.01	1.04	2.01
Risk that outputs are NOT produced	Low	Low	Very Low
Probability that outputs ARE produced	75%	75%	95%
Risk that usage does NOT occur	Very Low	Medium	Medium
Probability that usage DOES occur with outputs	95%	50%	50%
Overall Usage Probability	75% x 95% = 71.25%	75% x 50% = 37.5%	95% x 50% = 47.5%
Combined **probability of usages occurring to enable impact**	71.25% x 37.5% x 47.5% = 12.7%		
Risk of usages NOT occurring to enable Impact 1.01	Between 5% to 25% = **High**		

If an impact requires either Usage 1.01 OR Usage 1.02 to occur, you should calculated the probability of neither usage *not* occurring, or 1 – [(1 – Overall Usage Probability 1.01) x (1 – Overall Probability 1.02)]. For example, if the Overall Usage Probability of Usage 1.01 is 56.25% and the Overall Usage Probability of Usage 1.02 is 25%, the combined **probability of usages occurring to enable impact** is 1 – [(1 – 56.25%) x (1 – 25%)], or 1 – (43.75% x 75%) = 1 – 32.8% = 67.2%. This would represent a **Medium** risk of usages NOT occurring to enable impact.

If the impact relies upon a specific combination of usages then a combination of the above approaches would be required.

It is important to clearly justify why your end-users can deliver these usages and the methodology behind the risk rating calculation. In addition, you should discuss the relationship between the usages (if more than one is required to enable impact) and how they will collaboratively achieve the impact.

5.4 Impacts: Risk of monetary impact NOT occurring

The risk rating, assuming the required usages have successfully occurred and the desired impact is not realised, for each monetary impact provided. Determining this risk rating is likely to be substantially more difficult than estimating the other risks along the impact pathway. The majority of factors influencing delivery of expected impacts are well beyond the control of CRCs and inherently unpredictable. When assigning a risk rating, you should consider risk factors that may affect impact delivery such as:

- changes in the market for products or processes

- external factors such as drought, flood, recession or change of government

- changes to consumer preferences or the presence of rival products or processes

Risk Indicator	Very low	Low	Medium	High	Very High
Occurrence of contingent external factors	Very likely	Likely	Possible	Unlikely	Very unlikely
Process & translation timeframe certainty	Very high	High	Moderate	Low	Very limited
CRC control over benefit realisation	High	Reasonable	Some	Limited	None
Market competition	None, need exists	None	Some	Multiple similar	Market saturated
Output user impact track record	Strong	Good	Some	Minimal	None

Attachment A
Impact Tool flowchart from activity to impact