



CENTRE FOR
INTERNATIONAL
ECONOMICS

MLA Program Evaluation Framework

Prepared for:

Meat and Livestock Australia

REPORT 1 OF 9

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ABOUT THE CIE

The Centre for International Economics is a private economic consultancy operating out of Canberra and Sydney. It undertakes economic analysis for clients around the world.

The CIE solves problems for clients by rigorously analysing markets and regulations, appraising risks and evaluating strategies. We build economic and strategic frameworks to distil complex issues to their essentials. In this way we are able to uncover new insights about emerging developments and assess payoffs from alternative strategies.

The firm has been operating since 1986. Contact details are set out below and more information on what we do and our professional staff can be obtained from our website at www.TheCIE.com.au.

The CIE also co-produces a quarterly report called Economic Scenarios. This analyses global risks and scenarios and can be accessed from www.economic.scenarios.com.

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1

Introduction

MLA looks after Australia's biggest agricultural industry. It collects industry levies and allocates resources to marketing, R&D and other programs aimed at improving industry performance and prospects. In order to improve the allocation of resources, to manage risks and promote performance and to be accountable to their stakeholders, the MLA requires an effective program evaluation framework. This framework needs to be practical, consistent across all programs, cover ex post analysis as well as ex ante and incorporate triple bottom line assessments. The CIE was engaged to undertake this exercise. The project commenced on 1 February 2005 and was completed at the end of June 2005.

This report is the first in a set of reports that set out the work for evaluation. The other components are:

- a master questionnaire;
- a questionnaire manual, explaining how to fill out the questionnaire;
- a template of the program report with a 'manual' explaining what goes where and why, embedded in the template;
- a report on the ex post evaluation of the eating quality program used as a test run of the framework;
- a report on the ex ante evaluation of a methane reduction project used to test the triple bottom line aspects of the framework;
- a manual explaining the mappings and values for risk, environment and social outcomes;
- a manual and description of the economic module highlighting some 'rules of thumb' of where and why the big benefits lie and the distributional impacts; and
- a template for taking the basic report template and translating this to different reporting levels (annual report, MLA Executive, stakeholders, and aggregation across programs).

The context for program evaluation

The MLA Annual Report states that:

“Our mission is for world leadership for the Australian red meat and livestock industry.

We work to achieve our mission by:

- building demand;
- increasing market access; and
- developing competitive advantage from ‘paddock to plate’.”¹

More from Less sets out the current strategy. There are three strategic imperatives: ‘markets and consumers’, ‘supply chain’, and ‘product’. It also identifies strategic themes including:

- market access;
- product marketing;
- value adding;
- community concerns;
- whole-of-chain efficiency;
- food safety; and
- eating quality.

To some extent the business units in MLA relate directly to these themes but each theme will have a number of programs that contribute to its objectives. This makes evaluation along theme lines more challenging.

Targeting information for stakeholder groups

Levels of reporting

There are three main levels of information on programs required. These are at the:

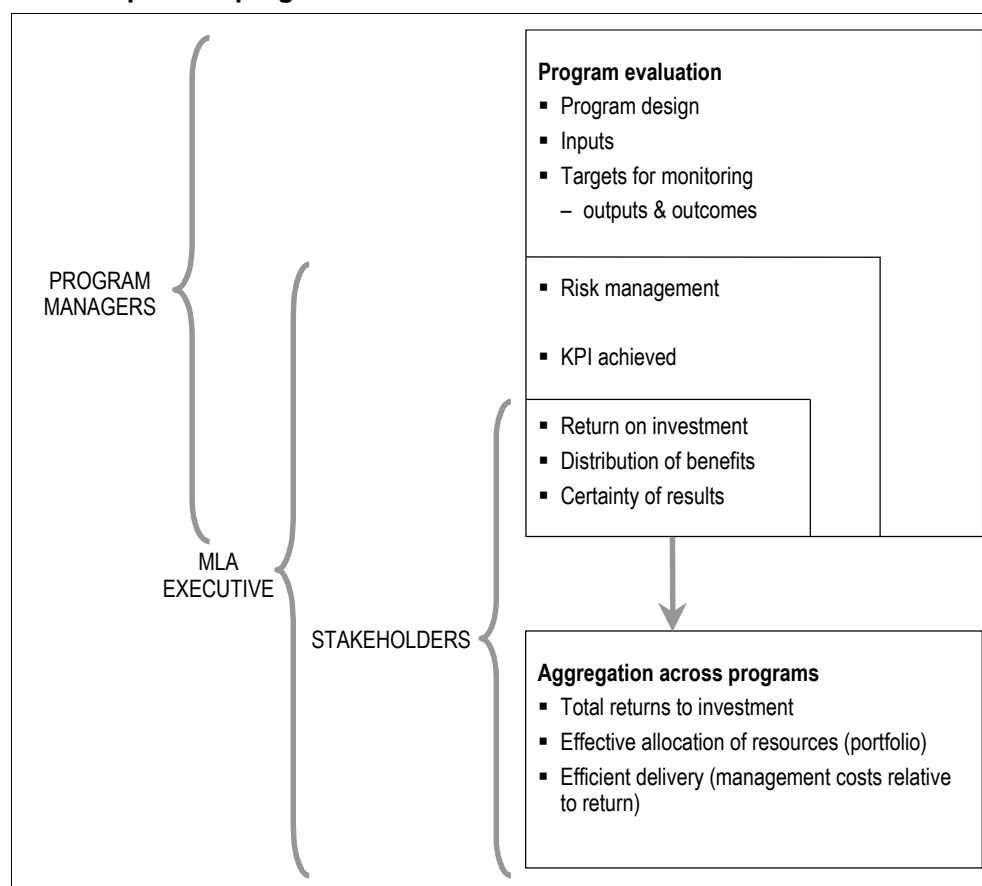
- program manager and management level, with a focus on program design, establishing credible targets and expected outcomes, managing risks, and learning to improve performance;

¹ The goals, themes and specific programs of the MLA are set out and relationships mapped in the *MLA Industry Programs Plan 2004-04 – 2006-07*, p. ii.

- MLA executive, with a focus on returns across the different program areas, improving allocation of resources within and to a lesser extent across areas, monitoring the achievements relative to the strategy, and the performance of the different business units and program areas; and
- External stakeholders, with funders wanting MLA to demonstrate their value for money. They want to know that resources were allocated as claimed (accountability), that the organisation delivered its programs in a cost effective way (efficiency) and that the returns on their investment were high (effectiveness).

Chart 1.1 summarises the three levels for reporting and the place of program evaluation in this hierarchy.

1.1 The place of program evaluation



Source: Centre for International Economics

Stakeholder interest

Detailed reporting requirements for different stakeholder groups was identified as part of the study. This is summarised in table 1.2.

1.2 Information requirements and proposed reporting by framework ^a

<i>Information</i>	<i>Government</i>	<i>Funders/MLA members</i>	<i>MLA Board</i>	<i>MLA Executive</i>	<i>Program managers</i>	<i>External stakeholders</i>
Input level						
Total investment by program area	XX	XXX	XXX	XXX		
Total investment by industry sub-sector		XXX	XXX			
Funding sources by industry sub-sector		XXX	XX			
Leverage – additional dollars attracted by MLA investment	XXX		XX	XXX		
Management inputs per dollar invested	XX	X	XXX	XXX		
Project inputs (cash, in-kind)					XXX	
Output level						
KPI – outputs delivered in a timely manner according to contract			X	XXX	XXX	
KPI – measure of output quality		X	X	XX	XXX	
Outcome level						
KPI – measure of adoption	XX	XXX	X	XX	XXX	
KPI – measure of immediate outcomes once adopted		XXX			XXX	
Measures of the impact on demand, supply, margins, risk, environment, social	X	XX	XXX	XXX	XXX	XXX
Anecdotal evidence on outcomes (especially social and environmental)	X	XXX	X	X		XXX
Net benefits						
Program TBL evaluation (from integrated framework)	X	XXX	XXX	XXX	XXX	XX
MLA TBL evaluation (from integrated framework)	XXX	XXX	XXX			XX
Effectiveness of strategies						
Complies with national priorities	XXX		XX	XX		
Consultative sound process	XX	XXX	XXX	XXX	XXX	XX
Demonstrated optimal allocation	XX	XX	XXX	XXX		

^a Number of X's denotes the level of interest in this information

Source: CIE based on discussions. Information needs to be reviewed with MLA

The main vehicles for reporting to stakeholders

Information on program performance is provided in:

- a *progress report* published for the June to December half. This is sent to key industry stakeholders;
- an *MLA Industry Programs Plan*, which sets out funding allocations and the KPIs for each program; and
- an *MLA Annual Report* provides information for each year as a whole.

The structure of these documents is consistent (based around themes and programs) to make it easier to track progress and show the activities that are planned to address industry needs. The program evaluation report template provides information for all three of these reports on individual programs (see Report 9 for the links). Aggregate information is also required for the progress report and annual report. Report 9 explains how this can be compiled.

Requirements for the framework

Criteria

MLA in commissioning this work, set out a number of requirements. The focus of the evaluation system is on assessing the expected and actual benefits resulting from MLA investments – that is, it focuses on the effectiveness of MLA investments. The system does not aim to measure the performance of MLA staff, although some of the key performance indicators (KPIs) can also serve this purpose. Nor does it explicitly address the efficiency of allocation of resources at project level or across the MLA portfolio. It does however collect useful information for these facilities to be added later if required.

The evaluation framework needs to satisfy not only the information requirements, but it should also satisfy the following process driven criteria.

- Be transparent to ensure credibility and provide evidence that best practice management is generating an efficient use of funds. Assumptions that behind the assessments of projects are made explicit. Logic is required to be expressed so it can be challenged. The process of moderation and verification is suggested for implementation.

- Include quality control procedures and verification when required by stakeholders. These processes should include independent evaluations or review of evaluations and top-down checking of quantitative evaluations to reduce optimism bias. A top-down process is recommended. The use of internal modernisation can be complemented with external reviews or getting outside experts to undertake the program evaluations.
- Be consistent across programs and with other government activities. Reducing all outcomes to 5 areas of impact helps improve comparability. A consistent set of information is collected on every project/program.
- Be consistent across time.
- Allow comparison of *ex ante* and *ex post* evaluations.
- Take into account the different life cycle stage of programs
- Draw on existing MLA performance reporting strengths and best practice.
- Provide information about the level of certainty about the measurement of outcomes.
- Be analytically rigorous.
- Produce information that is able to be communicated effectively to intended audiences – ideally the framework should be intuitively appealing – that is the users at all levels should understand the framework and how their information fits in; and
- Be relatively easy to use and be resource efficient.

The framework presented in this report needs to be a living document as do the various templates and tools that accompany it. The authors encourage all readers to consider how the framework could be improved and to actively engage to revise the framework and tools over time.

This report

This report sets out the evaluation framework. The framework has 3 parts:

- an analytical core (with the information required for analysis) (Chapter 3);
- a reporting template (Chapter 4); and
- a process for implementation (Chapter 5).

This report starts with a description of the essential concepts (Chapter 2). As words (such as outcomes) can have a multiplicity of meanings it is important that there is common usage across MLA. Achieving this goes beyond definitions of words to understanding how to articulate causality and uncertainty. Chapter 3 sets out the integrated framework. It is integrated across three dimensions:

1. It integrates risk and changes in social and environmental benefits with the economic effects – although not all social and environmental benefits can be measured in dollar values.
2. It covers how to collect and report information as well as how it should be analyzed. It therefore has process templates for collecting and reporting as well as an analytical set of tools.
3. It allows for aggregation across the MLA portfolio and develops information for portfolio analysis.

2

Essential concepts

The DOFA framework

The framework is based on the Department of Finance and Administration (DOFA) framework for accountability to government. This is an input/output/outcome framework. Its value lies in:

- measurement of the inputs;
- accountability for outputs delivered;
- mapping from outputs to outcomes and monitoring and measurement of outcomes where possible.

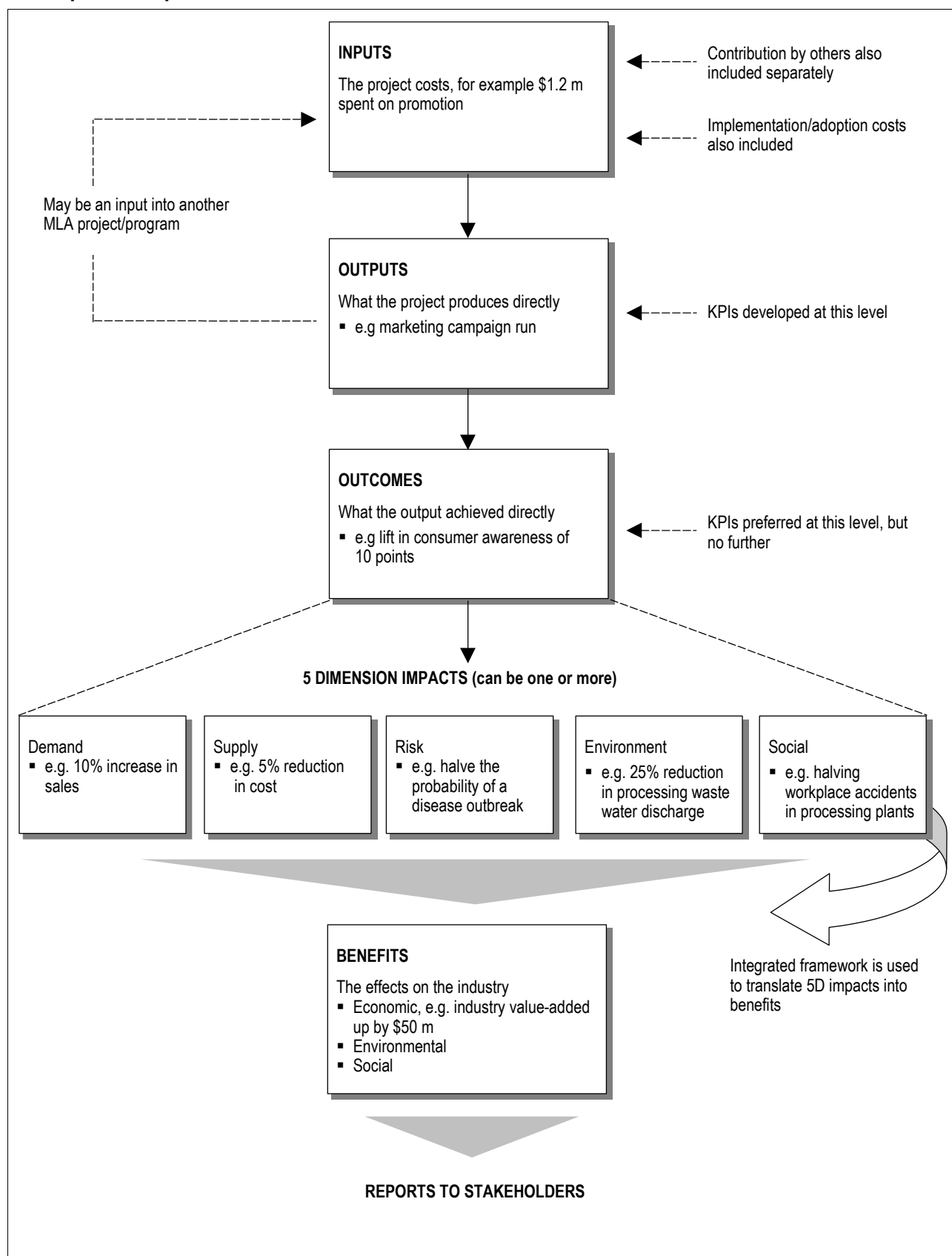
The evaluation framework outline on the DOFA framework is summarised in chart 2.1. The key definitions used are:

- Outcomes – these are the observable and measurable changes in practice and behaviour that result from the investment. They are often stated as the explicit objectives of the investment and may be set up as KPIs;
- Impacts – the impacts are an aggregation of the outcomes defined in terms of changes across 5 dimensions of outcome. These are:
 - demand
 - supply
 - risk
 - environment, and
 - social.

This is useful as it reduces all outcomes to a common set of measurements enabling comparability across programs with similar but differently defined outcomes.

- Benefits – are the end result of the impacts once all adjustments have occurred. They measure the return to the stakeholder and are what matters.

2.1 Inputs to impacts



Source: Centre for International Economics

Concepts used in the mapping

The impacts and benefits evaluation relies on a framework mapping from inputs to outputs, outcomes, impacts and benefits of an investment. These phases in the life of an investment are set out in chart 2.2. The concepts are defined as follows:

- Inputs – this must measure the full costs of the investment by MLA, and other contributors, and the time period over which the investment was made. These inputs may be in cash or kind (ideally converted to a dollar value).
- Outputs – the outputs can be direct and indirect and intended and unintended. The focus is usually on the direct intended outputs and often some of the indirect outputs are forgotten, yet can be more lasting. It is common to establish KPIs at the output level, such as an advertising campaign, a seminar conducted, a new variety of pasture, a document on a new management system. KPIs need to measure the quality of an output and not just whether it was achieved.
- Outcomes – this has a number of stages:
 - Outcomes that are the changes in practice and behaviour resulting from the adoption of the outputs. These are ideally set up as KPIs although MLA can not always be fully responsible for achieving them. They should measure adoption as well as the resulting change when the output is adopted. KPIs might include the number of producers adopting a new pasture management system who are involved in the Edge network, or the share of consumers that are aware of a product. The difference between an output KPI and an outcome KPI can reflect the extent to which expected results are actually achieved in real life rather than experimental situations.
 - Impacts, for the purpose of this framework, are defined as key parameters that can be used to summarise the net ‘first round’ changes resulting from the investment. This measure is essential for using the integrated framework and is the key to comparability across different projects and programs. In the pasture improvement example this is the higher volume/quality of production per fixed units of inputs (a shift in the supply curve). In the increase in sales case this is the higher volume sold at a given price or higher price willing to be paid for a given volume (shift in the demand curve). These changes are relative to what would otherwise have been the case (the counterfactual or baseline).

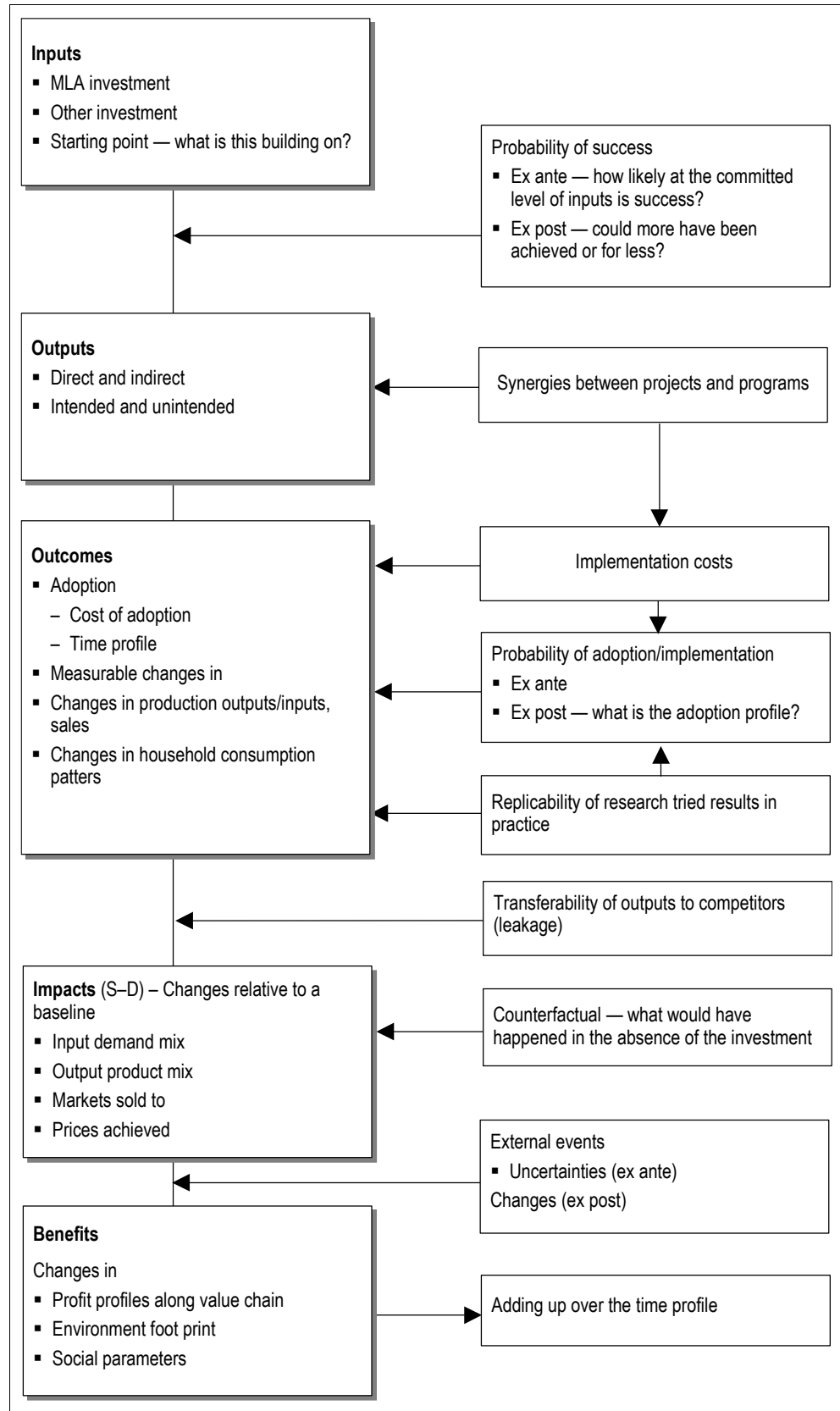
- **Benefits.** As producers compete for resources, and households have limited budgets, there is a need for a mechanism to work out how the changes at an individual unit (whether farmer, processor, retailer, consumer etc.) level add up at the economy level. The increase in production of one product diverts resources from other products, income spent on one product is not spent on another. To sort out the impact of the investment we need to model this behaviour.

The total net benefit flowing from an investment depends on all these phases. The focus of an economic impact analysis is on the dollars that go into the investment and adoption phase relative to the benefits in terms of profits (producer surplus) and consumer satisfaction (consumer surplus). The environmental and social benefits also depend on the net changes in volumes of production, inputs used, characteristics of products and production processes, and satisfaction of producers and consumers in the long term.

Between each of these phases are the qualifiers that determine the size of the final benefits.

- The probability of success of the investment is between the input and output phase. This is important as part of the ex-ante assessment. And ex post it is important to look at what outputs were achieved relative to the input effort and assess whether more could have been achieved.
- The synergies and complementarities between project outputs need to be considered as it impacts on the outcomes a project will have. Where the project is in the development cycle matters at this point as it may be an input into other projects and have no outcome on its own.
- Implementation costs are linked to adoption but are often taken for granted. The underestimation of the cost of implementation is a common problem in the evaluation of R&D and can result in overestimation of the adoption rate as well as underestimation of the true inputs required to deliver any benefit stream.
- The probability of adoption is between outputs and outcomes. Ex ante this is a critical parameter in assessing the potential impact of an investment. Ex post it reflects the uncertainties with future adoption rates.
- Replicability is often overlooked as it is often assumed that the same changes achieved under ideal conditions will occur in practice. Replicability measures the extent to which results under ideal conditions are replicated under actual conditions. They usually dampen but occasionally amplifies the outcome.

2.2 Phases in the life of an investment



Source: Centre for International Economics

- Counterfactual outcomes must be measured relative to what otherwise would have been the case in the absence of MLA's investment. A 'without' baseline for all of the outcomes should be projected and the outcome of the project measured as the change from this baseline.
- In moving between impacts and benefits there are a range of external events that will change the size of the benefit. These are uncertainties *ex ante* that should be identified and taken into account in deciding on the investment. *Ex post* they are the current state of affairs. Often they are still an expected future state of affairs unless evaluations are done a long time after the completion of the investment.
- Transferability or leakage measures the extent to which the investment has created an advantage for Australian competitors as well as for Australian producers. If the outputs of the investment are easily transferred to competitors the benefits may be short lived.

3

Integrated framework

The outline of the framework

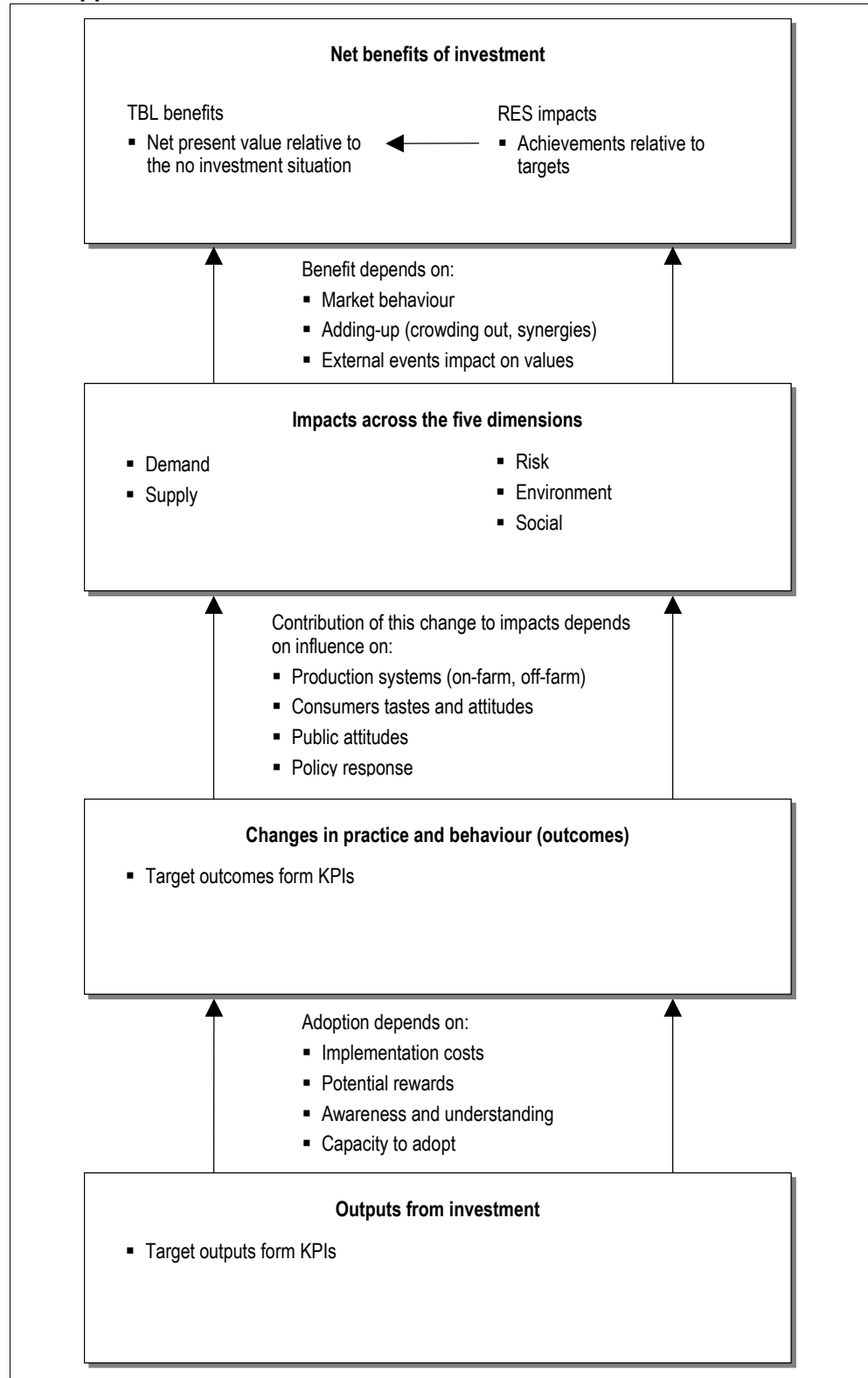
The logic of the approach

The objective of the framework is to provide MLA staff with the tools and information to assess the expected and actual impact of the investments made by the organisation on behalf of its members. The diverse interests of members and funders mean that the impacts to be measured go beyond profitability of the industry (and the distribution within) to the environmental and social impacts or triple bottom line (TBL). The value of evaluation at the project/program proposal stage, and after completion, is the learning it provides for improving resource allocation and decision making in the MLA.

To meet these needs the framework takes the approach of measuring impact where this is possible. Where it is not possible the approach is to evaluate achievement against objectives. To the extent that the objectives are about TBL impacts (such as profitability), these are the same thing. Thus the integrated framework takes a hybrid approach. The economic assessment at the program/theme level is measured in dollars, which while predominantly measuring economic benefits, includes the value of some of the non-economic TBL impacts. It also provides assessment of achievement against targets for the risk, environment and social impacts (RES impacts) where they do not have clear agreed non-market values. Note that where the RES impacts have a market value these are included in the economic impact assessment.

The approach to measuring the outcomes and impacts is consistent with the DOFA framework for evaluation. This has a management performance module running in parallel with the evaluation module. The integrated framework presented here does not include this performance measurement module. However, measures of outputs, adoption and changes in behaviour and practice (outcomes) required for evaluation form ideal key performance indicators (KPIs) at the project and program level and can service both modules. Linking evaluation and performance in such a way can also improve the credibility of evaluators. Chart 3.1 sets out the approach and terminology used.

3.1 Approach to evaluation



Source: Centre for International Economics

The integrated framework

The integrated framework has three main components:

- an analytical core that sets out how outcomes and impacts are assessed and valued;
- a set of tools and information for making this assessment; and
- a set of reports that will provide information to the various stakeholders.

Complementing this is a process for collecting information, undertaking analysis, providing moderation or checking of the estimates, and generating and distributing reports. This process is under the control of MLA and the design and embedding of this process is up to MLA (see chapter 4).

Performance information can be generated by the same process. At the output and change in practice and behaviour levels there are strong commonalities between performance KPIs and information required for evaluation of MLA's programs. This integrated framework will collect this information that can be transferred to a performance monitoring system.

Chart 3.2 sets out the integrated framework.

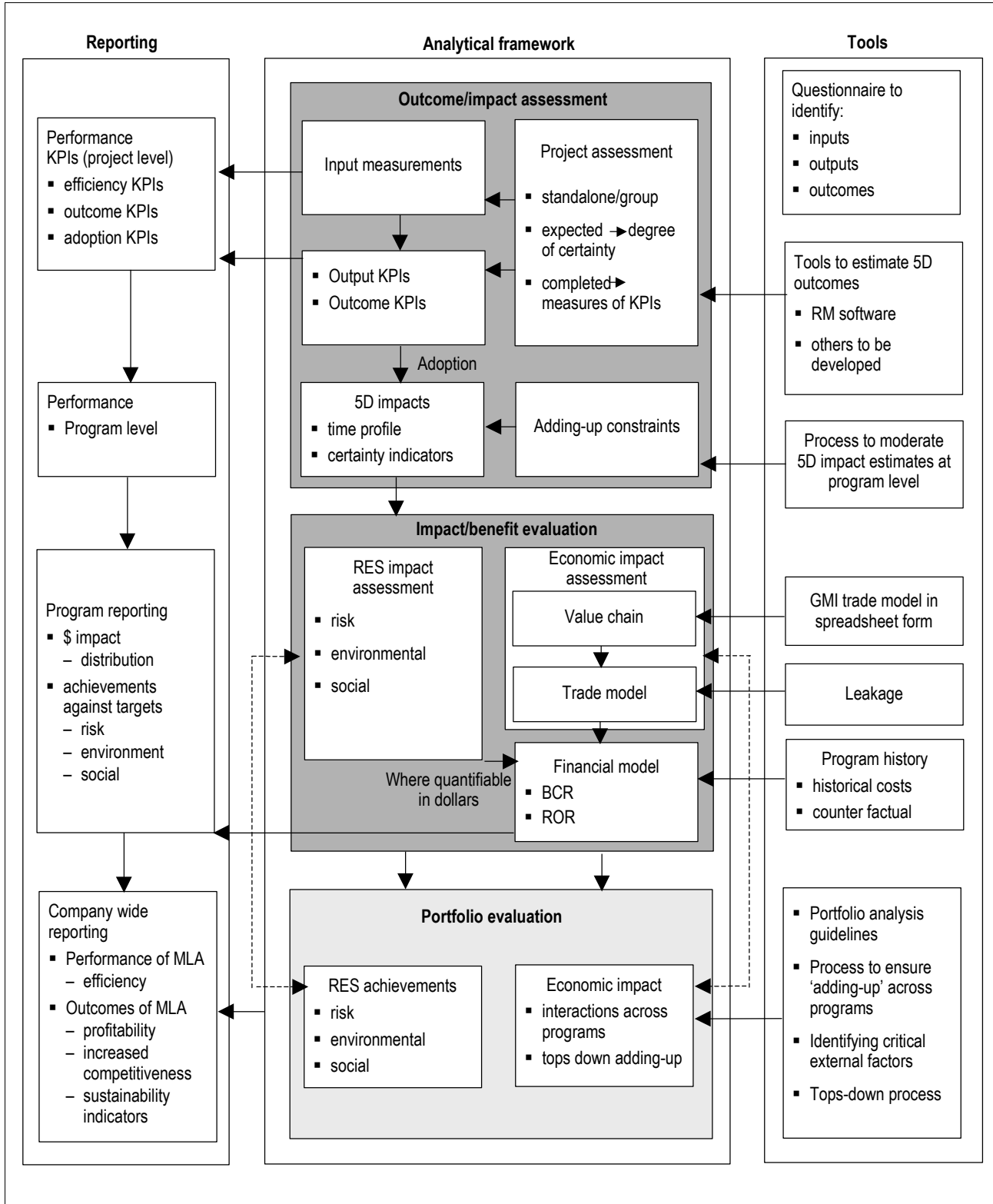
Key features

Projects are evaluated in program sets to reduce double counting

The 'program' in program evaluation has yet to be implicitly defined by MLA. For the purpose of the framework a program is defined by the outcome, and projects contributing to that outcome form the program. These may not always line up with business units or current program areas.

At each level there is explicit consideration of the contribution that the project/program makes to the program/strategic theme. The observable change in practice and behaviour usually arises from a set of investments rather than a single investment, especially in market access and R&D. This forces recognition of how projects work together to achieve outcomes and helps to reduce double counting, or more commonly, attributing the outcomes to the final investments in the program cycle. Recognising the projects and programs that work together to contribute to a common outcome is important for estimating rates of return. Inputs from MLA, and other sources, including in-kind inputs, need to be measured in order to estimate the size of the investment. There is also interest in leverage – the additional resources attracted by the MLA investment.

3.2 Integrated framework for program evaluation



Source: Centre for International Economics

Outcomes are mapped to 5 dimension impacts to allow comparability

All changes in practice and behaviour resulting from the MLA investments are distilled into their outcome across 5 dimensions – demand, supply, risk, environment and social outcomes. These outcomes are defined across industry sectors, products, regions and markets. Distilling all changes to outcomes across the 5 dimensions allows for comparison across different program areas as well as assisting in avoiding double counting.

A critical part of the framework is the tools to translate the changes in practice and behaviour (that are often the objectives of programs) into changes across the 5 dimensions. For on-farm R&D the RM software does this, allowing any on-farm productivity improvement to be translated to a unit cost of production measure. Program managers in some areas are using their own production models of their section of the value chain to work this out. This is an essential step in any benefit-cost evaluation.

Benefit measurement takes account of resulting market adjustments

The economic impact assessment module takes the outcomes across two of these 5 dimensions to work out what impact changes in demand, supply and margins have on profitability along the value chain. This approach takes into account how prices and volumes adjust in response to changes across these dimensions. The failure to take account of these market responses is a common problem in evaluations. For example consumers benefit from an improvement in productivity but producers are not as well off if prices fall in response to the increase in supply, and meat diverted into Japan cannot be sold in Korea. This module also allows the interactions across the different strategic themes and across industry sectors to be evaluated. For example, it can estimate the net effect of a campaign to increase demand for lamb on the whole industry as this also can dampen sales of beef.

RES outcomes impact through the market and because of non-market values

Changes in risk, environmental and social (RES) outcomes often have economic impacts as they can result in a shift in demand (for example health perceptions of red meat), supply (for example a reduction in water use per kilogram of turn-off). These are taken into account in the economic module. But there are often other impacts or benefits from these outcomes that need to be measured in a TBL evaluation. Two approaches are used to achieve this. Where there are well accepted ‘values’ placed on these outcomes, the dollar value can be included in an assessment of the net benefits of a project/program/strategic theme. This may be the case with

water returned to the environment, which has a 'value' measure in the price farmers are prepared to pay to retain a unit of water for production purposes. However, there are many RES outcomes that do not have a clear value that can be expressed in dollars. The evaluation will measure these in terms of achievement against target outcomes. These will be standardised as the percentage of target achieved, including exceeding the target. The environmental and social impact assessment manual details the approach.

The framework is identical for ex-ante and ex post evaluations

The framework can be applied at the project proposal assessment phase to assess the contribution of that investment to the program outcomes and their impact. It can be applied mid-cycle to assess the value in future investment, and at the end of the cycle to assess the net benefit of a program. What changes between these evaluations is the extent to which the parameters such as the probability of success, rate of adoption, translation of trial results to practice results, and knowledge of the external environment (such as world prices) are known. Ex ante evaluations use expected values (usually a probability distribution around a range) for all parameters while ex post evaluations may only need expected values for future external parameters.

Benefit-cost measures can be estimated at project, program and strategic theme levels

A 'financial module' allows for the benefit-cost ratio of any set of project/programs or strategic themes to be estimated. The rate of return can be assessed provided the total investment and cost of implementation is known and a sensible 'without the investment' scenario can be established. The certainty of the estimate can be assessed using the distribution of values for parameters rather than a point estimate where these are expected not actual values.

The integrated framework in detail

The integrated framework has three levels of analysis.

Level 1 – Outcome/impact assessment

Level 1 assesses outcomes at the project and program level. This can be applied to stand alone projects as well as the groups of projects in a program as well as the program as a whole. The main deliverable from this level of analysis that flows through to the next level is an assessment of the 5D impacts of the projects/program (see above). This level will link project and program KPIs at output and outcome levels to the 5D impacts. Thus it also delivers information on performance KPIs at the project and program level. This analysis can be used at the expected and completed stages of the project and program life cycle.

Information required/generated and recorded each year from the year of commencement includes:

- the investment made by MLA and other sources of investment (cash and in-kind (converted to dollars));
- ex ante only – the probability of outputs being delivered;
- outputs (to be) delivered – specified in contract – KPI;
- investment required for implementation;
- adoption rate – KPI;
- ex ante – probability of adoption – this is conditional on outputs having been achieved;
- outcomes of the project/set of projects/program – KPI. These should reflect the objectives. They should be quantified and measure the change in practice and behaviour relative to a baseline ‘without’ investment scenario. These should be outcomes in practice not in theory. For example, as a rule of thumb, around 50 per cent of the outcome achieved under trial results is achieved under normal conditions for grain production;
- outcome measures should have a time profile that will depend on adoption rates over time and the sustainability of the outcome;
- 5D impacts resulting from the outcomes above. These may map one to one, have a direct proportional relationship, or have a more indirect relationship where the best that can be stated with confidence is that there is a causal association between the outcome of the project(s) and the 5D impact; and

- anecdotal evidence of outcomes, including media reports, good news stories, personal endorsements, evidence of investments.

At the proposal stage of a project/program evaluation these values are all expected values. Where possible a probability distribution rather than a point value should be provided (for example, minimum, most likely, maximum value). Even some time after the program is completed, some of the adoption and outcome measures may still be expected rather than observed values.

This level estimates outcomes not the benefits or value resulting from the investment.

Level 2 – Impact/benefit evaluation

Level 2 provides for evaluation of the net benefit of investments. This is usually applied at the program/strategic theme level, but can be applied for stand alone projects if rate of return information is required. The aim at this level is to include all the programs that have common objectives and interact in achieving those objectives. It may be that analysis at the strategic theme level is more appropriate. MLA need to decide on the definition of ‘program’ but we would encourage making it the set of investments contributing to a common identifiable set of impacts. The analysis at this level has three elements.

An economic module

An economic module is used to estimate the net economic benefit of the demand and supply impacts. This module replicates the market response to these changes and measures the final benefits on production levels, costs, prices and quantities sold by product, market, and region. Information required (by product, market, region, point on supply chain) is:

- changes in demand and supply (measured as percentage changes, shifts in unit values or changes in margins); and
- leakage of the investment outcomes to competitors.

Information generated by this module is the change in:

- industry profits (change in value added) at each point along the value chain; and
- red meat consumer welfare; and
- net change in value added in the rest of the economy.

This module can be used to estimate the value of changes in risk as it can measure the cost of an adverse event or an opportunity arising. This is done by:

- estimating the impact of change in demand, supply or margins resulting from the event arising; and
- multiplying this value by the change in the probability of the event arising due to the reduction in risk.

The RES assessment module

The RES assessment module estimates the benefits of the risk, environmental and social outcomes (RES impacts) that are not taken into account in the economic module. As noted above some of the RES outcomes have direct economic impacts, examples include reduced salt concentrations lowering waste water disposal costs, reduced water use raising carrying capacity. This module aims to capture the non-economic impact aspects of RES outcomes. The information required (by point on the value chain and region) is:

- baseline values in the model (the ‘without’ scenario);
- RES impact measures;
- target values for these measures; and
- where appropriate and available, the non-market values placed on these measures.

The information provided is:

- measure of achievement relative to the target (as a percentage of target value); and
- where appropriate and available the value to specific stakeholders of the RES outcome. For environmental and social benefits (including those arising from reduction in risk) the stakeholders are the Australian public. For industry risk impacts (including those arising from environmental and social outcomes) the stakeholders are the relevant segment (sector and region) of the industry.

The financial module

The financial module is simply an adding up mechanism that allows the estimation of the net benefits of program investments. It also allows for the level of certainty around the estimate to be indicated through the use of

distributions for key parameter values rather than point estimates. Information required is the time profile of:

- investment (from level 1);
- implementation costs (from level 1);
- economic benefits (from level 2 economic assessment module); and
- RES benefit (from level 2 RES assessment module where values are available).

A common discount rate should be used for all evaluations across MLA (it is suggested to report results at 0, 5, 10 per cent rates). All values must be converted to constant dollars, usually in the year of the evaluation using a CPI index. Depending on the use of the information the present values could also be estimated:

- as at the year of the evaluation (discount future returns and compound past ones); or
- from the year of the initial investment.

This is useful for comparing across investments with very different time profiles. A standard period of 30 years from the initial investment is suggested for the assessment as returns after this period are so heavily discounted that unless they are very large the return will be very small.

The information provided at industry level and at economy-wide level is:

- the present value of the investment (PVI);
- the present value of costs (PVC) – (MLA investment plus implementation costs);
- the present value of the benefits (PVB) – (revenues and values generated less operational costs);
- the net present value of benefits (NPVB) – (PVB-PVC);
- the net benefit investment ratio (NBIR) – ((NPVB+PVI)/PVI);
- the benefit cost ratio (BCR) – PVB/PVC; and
- the internal rate of return (IRR) which is the discount rate at which the NPVB equals zero.

Level 3 – portfolio evaluation

Level 3 aims to evaluate the whole portfolio of investment. This is applied mainly at the MLA level integration. This level is only partly developed in this exercise focusing on sensible aggregation for reporting and moderation as an input into improving the impact assessment made by managers.

The main purpose of portfolio evaluation is to ensure that resources are allocated optimally across the organisation, and at the program level within the program. This requires information on:

- the interactions between the different elements of the portfolio – explicit recognition of the interdependencies of the investment outputs and outcomes such as synergies and crowding out; and
- the marginal returns on each investment allocation, that is the extra value generated by the last dollar invested in each area of the portfolio. The allocation is optimal when, allowing for the interdependencies, this value is equal across all areas of the portfolio (or program).

Given the constraints on the allocation of investment at the MLA program level, there is less value in developing sophisticated tools to optimise portfolio allocation. In any case the information base required for such analysis is lacking. At this stage this level will focus on providing some practical means of ‘adding-up’ the impacts of MLA investments to better identify the interactions between program areas and to better account to stakeholders on the contributions made by the different areas of investment and the effectiveness of the allocations made by MLA management. Information required is:

- observed performance of the industry over the past year (or specified period);
- identification of external events impacting on this performance (for example, exchange rate movements, world prices);
- expected program/strategic theme 5D impacts arising in over the period from past and current investments (from level 1); and
- assessment of the returns from further investment in each portfolio area (subjective assessment only of change in 5D impacts achievable from additional investment).

The economic module can be used, given this information, to identify the interactions between the program/strategic theme areas. This can provide input into an annual validation process to improve understanding of the contribution of the different areas of the portfolio to the observed performance of the industry (top down analysis).

The information generated is:

- explicit identification of the interdependencies across the portfolio and a case for efficient allocation of resources (given constraints);
- measures of the contribution of MLA as a whole to the current economic performance of the industry (comparison to the 'without' investment) and the contribution to the MLA RES targets; and
- tested estimates of future returns across investment areas. This is tested by challenge from other areas of the portfolio to defend the estimates made.

Table 3.3 sets out the levels, timing, who will be responsible, and reporting outputs.

The tools

The analytical tools and their data needs at each of the levels are contained in the economic assessment manual (Report 8) and the environmental and social manual (Report 7).

Level 1 – Measuring outcomes

Level 1 identifies and measures the expected and actual project and program inputs and outcomes and maps these to the 5D impacts.

Level 1 collects and records the information through the use of the questionnaire (Report 2). This is the main tool for reporting inputs, outputs and outcomes. It also asks program managers to estimate the impacts of the outcomes. MLA has a range of existing tools for doing this but gaps remain in some areas.

- The questionnaire (Report 2) is provided for the collection of information on inputs, success of the outputs, adoption, transferability (performance in practice) and the outcome. The outcome at program level (or for a set of projects in a program) is the change in behaviour and practice that the investment aims to achieve. It should be specified in the objectives of the investment and form a KPI.
- A set of tools, (existing MLA tools where possible), is used to convert this outcome into a change in a 5D impact(s). In some cases the outcome will be a 5D impact, but in other cases the 5D impact has to be estimated. The tools required to do this depend on the part of the value chain affected. It is important to have a standard set of tools for the mapping of the outcome to a 5D impact in order to ensure comparability across program areas.

3 INTEGRATED FRAMEWORK

3.3 Summary of framework by level

	Level 1	Level 2	Level 3
What is measured?	Outcomes –changes in behaviour and practice leading to changes in 5D impacts	Benefits on profits, consumer welfare, environmental and social values and on risk	Effectiveness of portfolio allocation
Level of assessment	Project, programs	Projects, programs, strategic themes	MLA portfolio, strategic themes
Output of assessment	The 5D impacts of the selected set of projects/program	The net benefit of the program (or selected set of projects if desired) measured as a BCR, ROR	Evidence of the benefit of the MLA <ul style="list-style-type: none"> ▪ interactions across portfolio ▪ net impact MLA ▪ contribution of portfolio areas
Treatment of TBL	Social and environmental outcomes are identified as 5D impacts	Social and environmental outcomes are mapped to changes in: <ul style="list-style-type: none"> ▪ perceived risk ▪ actual measured risk to economic outcomes ▪ economic impacts ▪ social and environmental impacts/benefits 	Presentation of RES assessment in terms of achievements against targets across the MLA <ul style="list-style-type: none"> ▪ risk management ▪ achievement of environmental impacts relative to targets ▪ achievement of social impacts relative to targets
Economic assessment	Assesses impacts only so will overstate the profits flowing from an investment	Benefit evaluation modules can be utilised at any time by program managers if capacity exists BCA can be applied at the project level for estimation of expected returns as part of business case for investment	Top-down assessment requires explicit consideration of external events impacting on economic outcomes. Allows for all interactions across program areas to be incorporated
Who makes the assessment?	Program managers	Depends where MLA wants to develop ability to run models in-house Program managers to run for their own programs CIS to run at strategic theme level	Annual process driven by CIS with input from general managers Possible use of external consultants CIS/IAC to compile Portfolio assessment by?
How often?	On-going basis for projects and routinely for program	On-going for program managers with assistance from CIS. Annual workshop of program managers for input to level 3	Annual – using input from levels 1 and 2
Moderation/ verification process	Program team meetings to moderate/validate analysis	Exposure to other program managers review External analytical input into annual assessment meeting/ external review	Program managers use a tops down process to justify program/theme level impacts Executive team to review and participate Stakeholder feedback

The Rendall-McGuckian (RM) software is ideal for on-farm estimates of supply outcomes (the 5D impact most relevant for on-farm outcomes). However tools still need to be developed for processing and other parts of the value chain. These may be ideal projects for Master's and PhD students that MLA often supports, as part of industry skill development.

Level 1 also requires a process to moderate the estimates of project and program outcomes and impacts. This process also aims to identify the interactions and to 'ring fence' projects that contribute to common outcomes. This provides an opportunity for learning and sharing of experience in program teams. It is more than a reality check but also serves this purpose and is essential to test the case for a project if the aim is to find external funding partners.

Level 2 impact/benefit evaluation

Level 2 requires the three modules that have been developed as part of this integrated framework.

- The economic impact assessment module integrates the existing GMI and trade models. A reduced form approach providing 'rules of thumb' is set out in the economic assessment manual (Report 8). MLA have to consider the best way to utilise the full power of the models, which require expertise to use effectively.
- A new framework for social and environmental impacts assessment is set out in Report 7.
- A financial model. This is already provided in the RM software for point estimates of parameters. This is a spreadsheet model that can be linked to @RISK to provide Monte Carlo functionality for sensitivity analysis.

Most of the information required to run these models will come from the level 1 assessments that are provided in the questionnaire. Additional information on program historical costs and major external events will be required for past investment impact assessments.

Level 2 analysis could be undertaken in-house on an ad hoc or routine basis by making the modules available to program managers to use. An annual review should use these tools to make consistent estimates for all the program (or strategic theme) areas. This review could be undertaken in-house by CIS or use external consultants. It should include a workshop for program managers. This will challenge program managers to defend their programs completed and expected outcome estimates, as well as estimating

the impact of these shocks in a consistent manner open to the scrutiny of others. This process is the link between levels 2 and 3.

Level 3 – portfolio analysis

Level 3 analysis is largely calling on MLA's collective expertise to better describe the interactions between the program areas. The economic module can be used to assess the collective impact of all the program 5D impacts but this is not easily translated to the financial model. A top-down approach can be used to assess the relative contribution of the different program areas to the observed performance of the industry (see Annex A). Given the difficulty of controlling for external events this is suggested more as a learning process than for reporting to stakeholders.

In looking at the expected returns from future investment the questionnaire includes questions to assess the interactions between program areas and the marginal returns as a precursor to a formal portfolio analysis. Such a formal analytical tool could be added later if desired.

Level 3 process must also generate and collate the information for reporting to government, members and external stakeholders. This includes collective assessment of achievements against targets impacting on sustainability (under the risk assessment section), as well as the achievements under industry competitiveness and profitability. Report 9 sets out the sources of information for reporting as well as the reporting templates. This program evaluation template is a stand-alone document (Report 4) that provides the structure for this report and considerations required. Notes in the template provide guidance in using the questionnaire answers to complete the reports.

Table 3.4 summarises the tools at each level.

3.4 Tools for analysis

Assessment ^a	Tools	Comment
Level 1 Outcome/impact assessment (project/programs)		
All projects/programs – expected outcomes reported in assessment of project/program proposal completed reported in project/program completion report	Project assessment questionnaire <ul style="list-style-type: none"> ▪ Investment (and leverage) ▪ P(success) ▪ Output KPI ▪ Adoption target KPI ▪ P(adoption) ▪ Implementation cost ▪ Replicability ▪ Outcome KPI ▪ Transferability 	Report 2. The manual setting out how to complete the questionnaire is Report 3. Responses to be recorded on a database for easy access and compilation Outcome measures utilise existing measures. Demand index, surveys, monitoring of adoption. For risk utilise new risk indicators being developed
Project/program 5D impacts Map from outcome to the 5D outcomes (quantified): <ul style="list-style-type: none"> ▪ Demand ▪ Supply ▪ Risk (R) ▪ Environmental (E) ▪ Social (S) 	RM software for on-farm Value chain model for off-farm Demand mapping Estimate RES outcomes score on scale of low, medium, high (scoring guidelines) Quantitative RES indicators for 'high' expected outcomes	See questionnaire manual and economic manual for guidance. For high score RES need to develop a verifiable indicator and implement with project/program
Level 2 Impact/benefit evaluation (program/strategic themes)		
RES impact assessment	Framework to assess flow onto economic module expected – set targets completed - measure of achievement Value estimates – where quantified and relevant value estimates available	Links closely to the verifiable indicators developed in level 1 Web diagram presentation of achievement relative to target Can use benefit transfer techniques and shadow prices to estimate non-market values
Program/strategic theme economic impact	Economic impact assessment module	Rules of thumb (Report 8)
Net benefit assessment – BCR and ROR	Financial module Input from RES impact assessment where in dollars	This can be applied at level 1 if required Already embedded in RM software
Level 3 Portfolio assessment (effectiveness at MLA level)		
Aggregation for presentation	Questionnaire information on database	Aggregation at input level by keyword possible. RES outcome assessment score level.
Top-down evaluation of contribution across portfolio	Economic impact assessment module to assess net impacts of current outcomes from past investments	Need to establish a clear baseline 'without' scenario Need to identify and control for external events Can be used as a diagnostic tool to see where crowding out/in occurs Provides returns along the value chain
Portfolio analysis	Economic impact assessment module used to identify interdependencies Assessment of RES impact interactions Marginal returns analysis	Subjective assessments based on program manager judgement and learning process in annual workshop

^a Performance measurement (efficiency of MLA) is not the focus of the evaluation framework which focuses on effectiveness measurement.

4

Processes for implementation

Using the framework

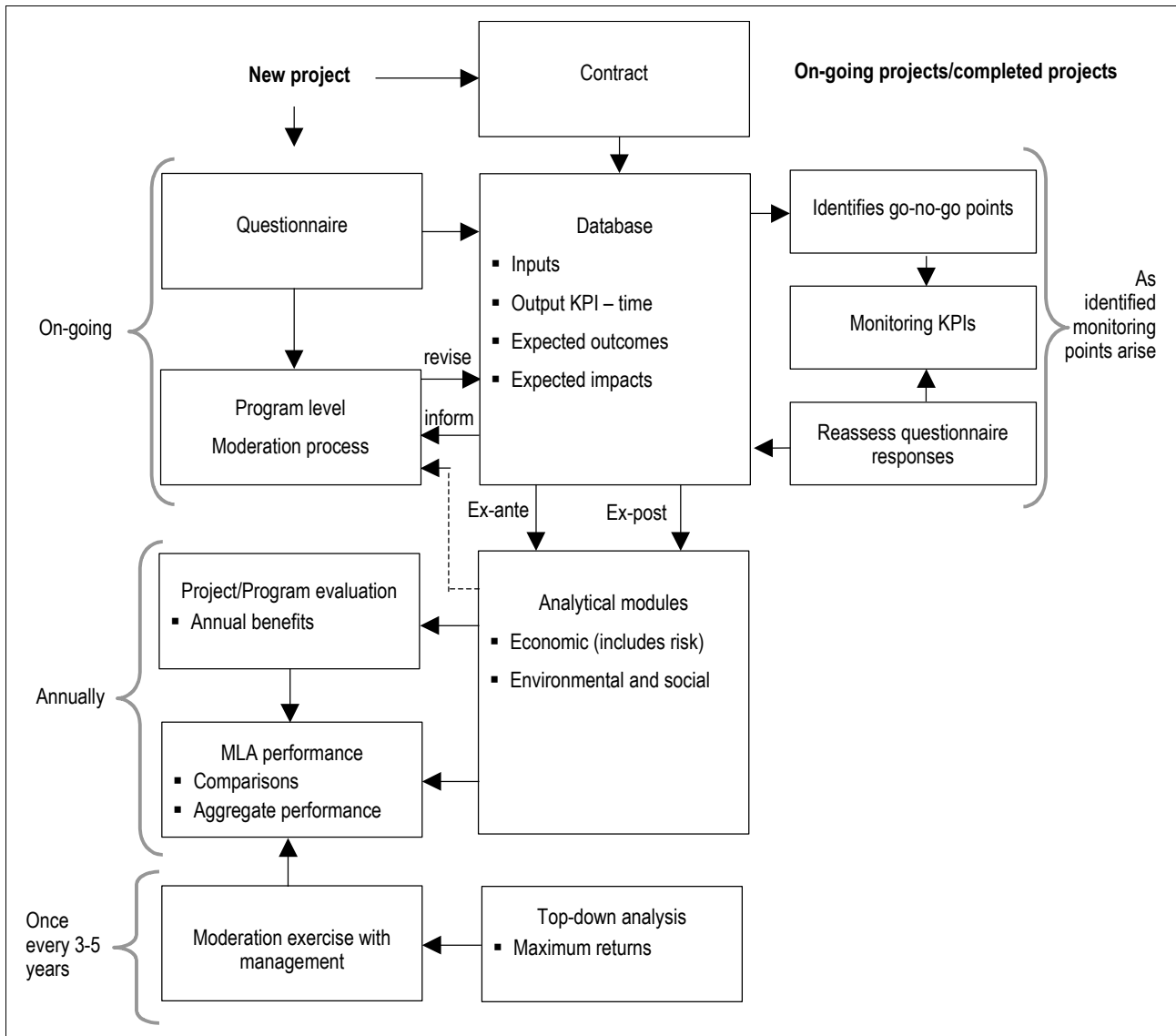
The process that MLA should go through in using the evaluation framework is outlined in chart 4.1. While it looks complex it is essentially a three stage process, with the first stage being on-going throughout the year as part of good project management, the second an annual process and the third an every 3 to 5 years exercise.

Stage 1 – Collection of project/program information

Stage 1 is the collection, revision and maintenance of information on each project/program that is maintained, ideally in a central database. This is undertaken on an on-going basis as new investments and go-no-go decisions are required. It has three steps:

- Step 1 – completion of the questionnaire for all new projects (ideally directly onto a database);
- Step 2 – revision of the responses in the questionnaire at go-no-go assessment points (including completion of the project) to update in the light of new information and observed outputs/outcomes;
- Step 3 – moderation of these responses through an internal review process at the program level. This is already undertaken, the only difference is that more formal input will be available. The database information should be revised in the light of the collective judgement of MLA managers, with or without external assistance.

4.1 Outline of process



Stage 2 – Annual assessment process

Stage 2 is the annual assessment process. It has three steps:

- Step 4 – undertaking a full evaluation of the program by each program manager. This may involve several BCAs of sets of related projects rather than a single BCA for the whole program. It is undertaken using the information in the database to complete the program evaluation template. It may be appropriate for MLA to provide additional assistance to program managers to undertake this evaluation. If little has changed from the previous year then the task will be a small one. The big costs are in getting this evaluation system

up and running. Once fully operational there will be less effort required to undertake this annual task.

- Step 5 – moderation by the program managers meeting to discuss the results of the program evaluations across the organisation. This is an opportunity to identify optimistic assumptions, to assess double counting (crediting the impacts to more than one program), to identify areas of synergy and crowding out. The result will be more realistic estimates of the expected impacts of programs. These estimates should be fed back into the revised impact estimates.
- Step 6 – is optional, but would see a revision of the estimates based on the information coming from the program managers forum. It could rerun the evaluations at the program level and provide not only individual program benefit estimates but also aggregate estimates for reporting to stakeholders.

Stage 3 – Validation and learning exercise

Stage 3 is a validation and learning process, which could be undertaken every 3 to 5 years. It would involve a ‘tops down’ exercise to assess the ex poste contribution of MLA over a previous defined period.

Verification processes

At each stage there has to be a process of moderation or verification as what goes into an integrated framework largely determines what comes out. Most of the information on the expected impacts of a project lies with those experts actually working on the project and the program managers.

There may be an incentive for program managers and researchers to overstate potential impacts to secure future funding or it may simply stem from enthusiasm about the program and/or a failure to provide a complete context in which the investment is carried out. Two ways to overcome are independent reviews by outsiders, which is expensive or peer review, which can also be expensive. To some extent a ‘tops down’ moderation process, described above, can also be beneficial. At least it can establish boundaries for a whole-of-program set of benefits. If sub-programs or projects start producing benefits greater than deemed reasonable for a whole-of-program there is an automatic tendency to moderate benefits claimed for specific projects. We would recommend a ‘tops down’ moderation exercise takes place say once every 5 years. This could be combined with a peer review.

Peer review

The first level of verification must occur inside MLA. We recommend a process of peer review. Verification is essential between outputs and outcomes, and outcomes and impacts. The way these numbers are arrived at should be checked and debated.

Independent review

Independent reviews are a more expensive method of verification. They increase the external creditability of results, in much the same way as an audit. This may be an option MLA takes for those projects generating a very high NPV.

Tops down approach

The tops-down approach recognises that any benefits attributable to MLA are part of the performance of the industry as a whole. So, for example, if Australia's productivity grows by 4 per cent and Uruguay's grows by 3 per cent, then this gives some broad benchmarks of what it is possible for the MLA to have done. (Uruguay has no MLA equivalent.)

Such a tops down approach needs to use comparisons with other countries or areas as well as industry wide statistics to get a broad idea of what the MLA may have done. It also needs to break the evaluation results into that for the current year, rather than for the much longer period considered by the aggregated NPV.

The purpose of the 'tops down' approach is to provide a consistency check on the contribution claimed by each of the MLA component programs to the total benefits. To do this a methodology is required to derive a total benefit of MLA activity. A possible methodology is suggested in annex A.

Getting from where MLA is now to where it wants to be

Avoiding duplication in information collection

MLA already collects information on inputs and outputs. Much of this is embedded in contracts and is on CARGO. Parts of MLA also collect information on outcomes but these tend to vary by program. The most developed is the use of IMAP for on-farm R&D. It collects much of the information in the questionnaire as part of making ex ante assessments of

on-farm projects (for value over \$100,000). However, a lot of the information is implicit and judgements are recorded only as scores and not as values.

The MLA has a number of tools to assess outcomes such as the demand index, surveys, Breedplan etc but impact information is currently collected. The main exception is again on-farm R&D which has the Rendell-McGuckian software. However MLA uses spreadsheet models quite extensively in project evaluations and many of these effectively estimate impacts.

It was beyond the scope of this project to develop the database for the questionnaire. However, it is recommended that all common information that is recorded electronically be in a format that allows it to be extracted for downloading into the questionnaire form template.

This should reduce double entry and allow also for confirmation of this information in other systems. The main overlap will be in the inputs and outputs sections of the questionnaire.

Developing the tools to map from outcomes to impacts

As discussed above MLA has developed a number of tools, most unique to their program area, that allow outcomes to be monitored and/or estimated. Both facilities are needed in the tool set. The questionnaire stimulates the demand for tools that will provide ex ante mappings from outcomes to impacts, and also in some areas, to from outputs to outcomes. These need to be predictive, based on an understanding of the relationship between outputs, outcomes and impacts.

Some program areas need to expand this tool box to better understand and/or formalise their understanding of these relationships. This is an area where researchers undertaking a Masters or PhD in economic disciplines could provide valuable input.

The questionnaire also prompts program managers to establish KPIs at the outcome level that can be monitored and the process has prompts for reviewing progress. The development of indicators in the areas of risk, environment and social outcomes and impacts is in early stages. Ideally a common core of indicators in these areas can be agreed upon by the industry owned organisations and the rural research and development organisations. MLA could take the lead on this. Work being undertaken by the Bureau of Rural Science on the 'sign posts' project is also potentially relevant. It will be important to be aware of the cost of monitoring, and to assess the program development value in the monitoring, in making decisions on indicators to be collected.

Roll-out

The program evaluation framework needs to be rolled out over a fixed period of time. While the questionnaire can be used and data recorded electronically, progress on the database is essential for accessing the full functionality of the framework. Once the questionnaire is up as a form on a database, it is also relatively easy to amend and to add other questions that might be thought useful. An electronic 'go to' also means that program managers only see the relevant parts of the questionnaire so it looks less daunting than the paper copy.

Program evaluation reports should be scheduled on an opportunistic basis based on new projects/programs coming on line, go-no-go decision points looming, and stakeholder demand as well as program manager available resources. External assistance may be required to get the program evaluation reports completed more quickly.

Steps in implementation are:

1. development of a database so the questionnaire can be filled in electronically with responses recorded as data fields on a MLA database;
2. prioritisation of the programs for evaluation with input from program managers to establish a timetable;
3. trial evaluations of a small number of diverse programs with external assistance on mapping impacts to estimates of benefits;
4. workshop with program managers involved in trial to review:
 - questionnaire – clarify wording improve ease of use etc;
 - identify tools needing to be developed – potential for tools in some areas to be used in others;
 - strategies to develop tools required;
5. develop a strategy for using economic assessment module – this could be brought in-house or remain something to be contracted out;
6. revisions of questionnaire, process, manuals and templates based on workshop feedback;
7. program manager training on use of the framework;
8. continued roll-out of program evaluations, ensuring internal verification processes being implemented. Highlights sections completed for all program areas;

9. annual meeting of program managers to present and moderate results and discuss synergies, crowding out etc. Development and testing of material for the annual report;
10. tops down process once all major program evaluations are completed to provide overarching moderation.

A

Tools for level 3 analysis

Tops down assessment

- Establish expected outcomes for key industry drivers using industry benchmarks and rules of thumb for:
 - on-farm productivity
 - off-farm productivity
 - shift in demands in each market
 - other competitors.

Supply side

- Some of this information is already incorporated into the baseline of the *Integrated Framework*.
- For example, the forecasting process assumes that the underlying rate of productivity in Australian grass fed beef is 1.5 per cent per year.
 - This is compared to annual productivity of between 6 and 7 per cent from the poultry processing chain.
- There is a need to be careful how these shifters are interpreted. In this case - it is the increase in output, at both farm level and processing level, given no change in price.
 - Therefore this measure can encompass such factors as pasture productivity and higher turn-off on-farm through to improved processing efficiency.
 - This number also includes the effects of MLA programs that are currently in place.
- Therefore, a judgment would have to be made on the maximum productivity possible in the grass fed chain - say 2 per cent per year or around a third of poultry.
- Also we would need to state the maximum contribution of MLA to that improvement.

- MLA has little impact on the processing sector which represents one third of the processing chain's costs.
- Base on-farm productivity would occur without the MLA - especially by leading and corporate producers.
- As a guide we could say that MLA could contribute *at maximum* between 0.5 and 0.75 per cent productivity improvement per year.
- A key factor would be to identify between 'shocks' that are:
 - one-off in nature; and
 - longer term improvements – where the bulk of improvements would be expected to come from.

Demand side

In the *Integrated Framework* we include some limited information concerning trends in demand for beef by each of the markets. The ones that we currently account for are:

- the shift towards grain fed beef away from grass fed in the Australian market – currently we use a 5 per cent annual shift;
- the shift towards beef generally in the US market (at the expense of the white meats); and
- the recovery of beef consumption in Japan from the food scare lows of 2001.

These types of 'shocks' illustrate that is very important to distinguish between:

- one-off changes in markets (the result of a short and sharp promotions campaign or recovery from food scare); and
- longer terms shifts in demand towards a product.

Using a similar methodology to the supply side is more difficult because it is harder to establish sensible rules of thumb especially by market:

- the work that we have done using demand indexes may be of use here in establishing the average trends towards or away from Australian product in the key markets;
- having an average trend, you may then set a maximum value as the sum of the activities of both MLA and private companies; and
- the final step would be attribution of the total effect between MLA and other factors.

Advantages of the approach

How should MLA use this approach? It could be used at two levels.

- The inputs or 'shocks' to the tops-down approach would serve as checks or guides for the information imputed into 'bottoms-up' framework.
 - This is especially true where there is a one-to-one correspondence between the shocks required for the 'tops-down' and the 'bottoms-up' approach.
 - The effect of MLA in promoting in an export market would a classic example – we are comparing the benefits of relatively small number of MLA activities in Japan with what is the maximum you could expect from that market.
- At a higher level of aggregation, the 'tops down' approach would serve as a consistency check for the gains possible across a range of MLA programs.
 - The net effect of MLA on-farm programs is a good example here. The outcome from the bottoms up approach could be increases in profitability the same as that implied by an average productivity increase of 2 per cent per year.
 - This would indicate that program managers have most likely been optimistic in their assessments of the benefits of their programs

These results would effectively moderate the inputs supplied by program managers.

Portfolio assessment inputs

One of the requirements for program evaluation is to be able to allocate the portfolio of MLA investments to maximum benefit to the industry (in a triple bottom line sense).

To fulfil this function requires using the results from the framework to check how close current expenditure across programs is to that which is optimal. That is there any scope to increase the returns to the total portfolio by re-allocating spending? This stage also has direct implications for the data requirements from program evaluation process.

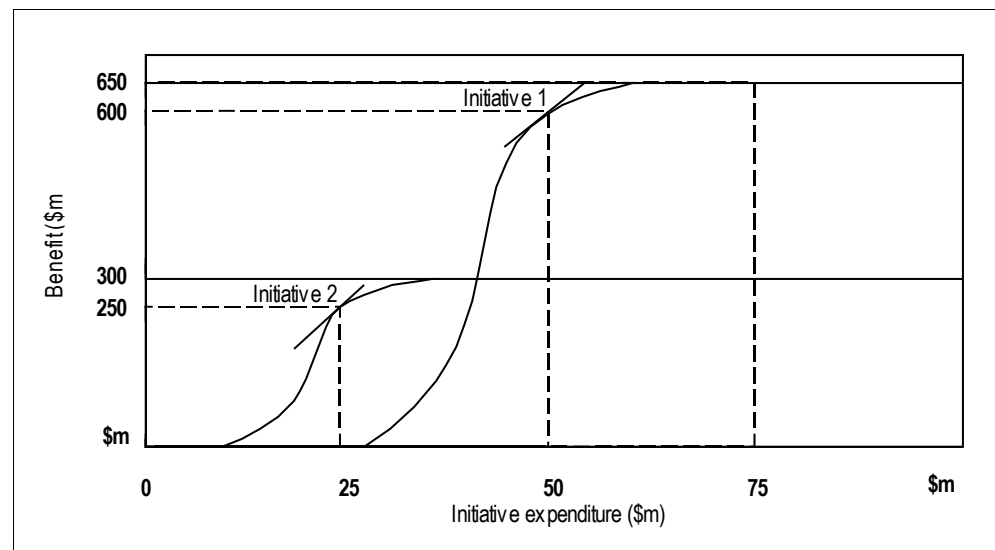
Making decisions about portfolio re-allocation involves allocating expenditures at the margin. The average benefits and costs from each program need to be supplemented with information on the relationship between

expenditure level and expected benefit to establish marginal benefit–cost relationships. This is illustrated in charts A.1 and A.2.

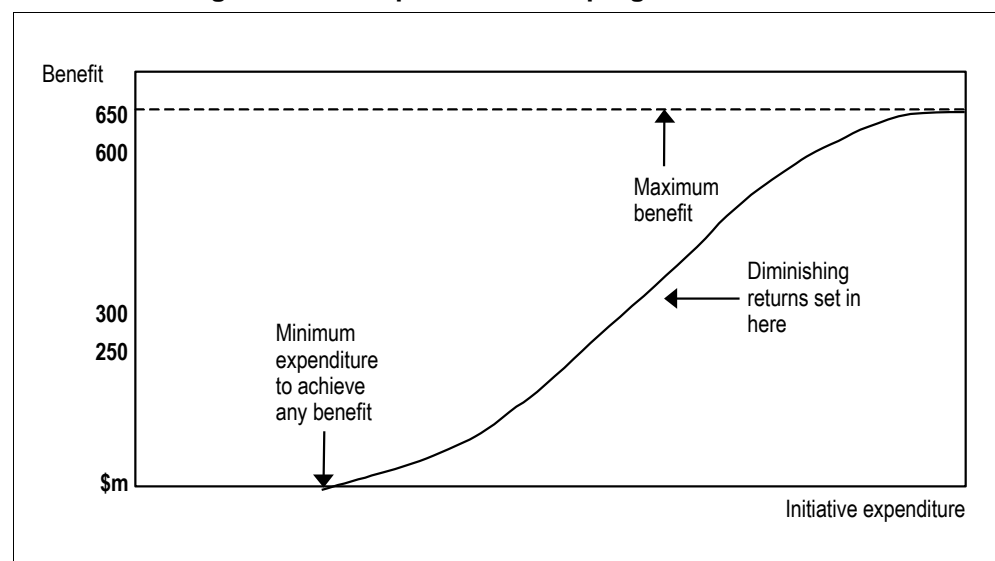
Chart A.1 shows that at each level of expenditure there will be an expected benefit and hence benefit–cost ratio. The higher the level of expenditure the more likely it is that the maximum benefit of a program will be realised. But as more is spent on any particular program, after some point the effectiveness of each additional dollar of funding will decline due to diminishing returns.

Chart A.2 illustrates the optimum allocation rule.

A.1 Equating the marginal benefit–cost ratios gives maximum payoff



A.2 Diminishing returns to expenditure on a program



In the above example there are two initiatives each with different benefit-expenditure ratios. Initiative 1 has a higher benefit-cost ratio than initiative 2. But this does not imply that all funds should be spent on initiative 1. The total budget to be allocated is \$75 million. Spending \$50 million on initiative 1 gets most of the maximum benefit (\$600 million rather than the maximum of \$650 million) with a benefit-cost ratio of 12:1. Spending the additional \$25 million on this program yields a much lower benefit-cost ratio than the first \$50 million. It would be far better to spend the remaining \$25 million on initiative 2. This would provide a benefit-cost ratio of 10:1 and give a total benefit-cost ratio for the budget of 11.33:1 which is a 30 per cent higher return than if all funds were allocated to initiative 1.

The general principle for maximising the total payoffs to the portfolio is to spend up to the point where the extra benefit from spending an extra dollar on one initiative is the same as in all other. That is, the slopes of the benefit curves in chart A.2 are the same for all initiatives. At this point reallocating money from one initiative to another cannot increase the total benefit.