

Linking regional pest management activities to outcomes: a template for using intervention logic models in regional pest management strategies



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Linking regional pest management activities to outcomes: a template for using intervention logic models in regional pest management strategies

Envirolink Project 896-HBRC135

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December 2010

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LC 89

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Summary

Background

- There is a clear need for councils, on ratepayers' behalf, to make more explicit, and demonstrate and communicate more effectively, the links between programmes and the contribution those programmes' outputs make to the broader scale community outcomes being sought.
- The adoption of an outcomes-based approach using intervention logic models (ILM) as a backbone would allow councils to: ensure programmes are achieving their goals most cost effectively; report performance clearly to internal and external stakeholders; and, contribute to and align with the national performance measurement framework for pest management.
- This report (funded by Envirolink Medium Advice Grant HBRC135) outlines the key concepts in the use of ILM and provides advice for the incorporation of these methods into regional pest management strategies (RPMS) and associated reporting media.

Performance measurement

Effective performance measurement consists of the following key steps:

1. Programme outcomes are defined in advance in line with agency policies and aims.
2. Clear links are made between interventions and expected outputs and outcomes.
3. Indicators and measures of performance are used to gauge programme progress.
4. Performance measures are used to (a) provide feedback which, in turn, guides programme improvements, and (b) report performance clearly and effectively to stakeholders.

Conclusions and Recommendations

The following amendments to the current generic RPMS structure are suggested to align regional authorities with best practice performance measurement.

In Part 1 Introduction and background:

- The standard terminology for performance measurement (shown in Table 1 of this report) should be included as part of the glossary of terms.
- The link between the activities to be carried out under the strategy and the Community Outcomes for the region, as listed in the current LTCCP, should be made explicit in Part 1, either instead of, or in addition to, the goal statement.
- This linkage would provide a point of reference for the alignment of individual pest management programmes (as described in the subsequent sections) with the 'big picture' aims of the regional authority.

- Alongside the description of the statutory framework a sub-section should be included to make explicit the link between regional pest management activities and national outcomes and intermediate outcomes from pest management. This would show clearly how regional programmes contribute towards national outcomes.

In Part 2 Pest management programmes:

- Pest programme outcomes should be defined by considering what the system state (economic, environmental, social, and cultural) would be in the absence of the impacts of the pest.
- To make explicit the links between a programme's activities and the intended outcome(s), an intervention logic model should be developed for each pest or group/category of similar pests showing the logical links between the activities carried out by council staff or others (e.g. landowners) to control the pest, the outputs from those activities, and the intermediate and longer-term outcomes from the programme.
- Some pest programmes may involve a number of groups of activities such as direct control, monitoring and community engagement, which, in turn, may lead to a number of outputs and intermediate outcomes. The graphical representation for such a programme may appear quite complex and such detail may be best placed in an appendix to the main body of the RPMS document. If this is the preferred option, the essential features of the programme should be summarised in a table beneath the description of each pest.

In Part 3 Strategy administration:

- Adequate reporting on progress towards outcomes is essential to allow an assessment of whether the activities are making any difference to the community or natural environment within the region, or of progress at a national level.
- The emphasis on reporting outcomes does not mean that recording and reporting on activities and their outputs no longer has value. These measures inform on the efficiency with which an agency carries out its work and should be viewed in this context. What is required is a set of indicators that fill the gaps in the conceptual logic pathway from 'doing things' to knowing whether those efforts have made a difference.
- Agencies cannot measure everything that 'should' or could be measured. Pest management programmes frequently contribute to a range of economic, social and environmental outcomes. Managers have to assess not only whether a performance indicator assesses reliably whether an outcome is being achieved, but also whether the appropriate monitoring tools, capability and budget are available. The focus should be on the 'vital few' indicators that can inform a general assessment of a programme's performance.
- The level of investment into measuring performance is an issue that will confront most managers. As a general rule, it is likely that this investment should reflect the overall value of a programme compared with other programmes.
- Different reports have different purposes and, accordingly, different target readerships, so each indicator/measure of performance should specify where it will be reported and its reporting frequency.

1 Introduction and report structure

Internationally and within New Zealand, measures of performance for work programmes are moving from a focus on outputs (activities and their immediate results) to outcomes (the changes in the community or environment resulting from a programme's activities). Regional councils and MAF Biosecurity New Zealand (MAFBNZ) have recently reviewed the current state of performance measurement in pest management and the extent of outcomes measurement and reporting by councils, and both concluded that there is significant need to improve the clarity of linkages between what is done and the intended outcomes of the programme, and the levels of consistency in methods for defining, measuring and reporting performance towards programme and community outcomes.

Perhaps the most commonly used approach to summarising the critical components and measures of a programme is the intervention logic model (ILM). This method is used by MAFBNZ, the Department of Conservation (DOC) and the Animal Health Board (AHB) as well as by many natural resource management agencies overseas.

This report (funded by Envirolink Medium Advice Grant HBRC135) outlines the key concepts in the use of ILM and provides advice for the incorporation of these methods into regional pest management strategies (RPMS) and associated reporting media.

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| Section 2 | Provides international and national context to the shift from reporting primarily on outputs to outcomes |
| Section 3 | Gives a general overview of the principles behind performance measurement and describes the use of intervention logic models |
| Section 4 | Reviews the current common RPMS structure and suggests how this can be modified to increase alignment with intervention logic principles |
| Section 5 | Proposes a template for restructuring the relevant sections of an RPMS, using the current Hawke's Bay RPMS as an example |
| Section 6 | Outlines the identification and use of appropriate performance indicators and links these to regional council reporting processes |
| Section 7 | Provides a set of example intervention logic models based on current Hawke's Bay Regional Council pest management programmes |

2 Background

2.1 National context

Pest management in New Zealand is carried out by a range of national, regional and local agencies to achieve reductions in the economic damage due to pests, risks to human health, and, the impacts of pests on environmental (primarily biodiversity) values. A review of the first five years of the New Zealand Biodiversity Strategy (2003) noted that the industry had patchy monitoring and reporting systems and an absence of quantifiable targets in achieving conservation outcomes (Green & Clarkson 2005). The Biodiversity Strategy itself highlighted the need for better-coordinated pest management between central and local government agencies. Key to this was the expectation that 'transparent and effective measures' for monitoring progress were established. In May 2005, the Biosecurity Central Regional Government Forum confirmed development of 'pest management indicators and monitoring for the system as a whole' as one of its seven strategic priorities for pest management.

Individual organisations responsible for managing pests in New Zealand, notably the DOC, AHB and regional councils, have acknowledged the need for evidence-based reporting of the benefits of pest management activities to (1) meet obligations under the Resource Management Amendment Act (2003) and the Biosecurity Act (1993); and (2) justify and prioritise expenditure on pest management.

As part of the wider Future of Pest Management initiative, MAFBNZ are developing a performance measurement framework (PMF) for pest management based on best practice measurement of outcomes. External to MAFBNZ, the PMF will link to agency frameworks based on similar methods that are either currently in use (e.g. AHB) or under development by other national agencies, such as DOC. The PMF will both draw on and guide initiatives by regional and district councils to move to outcome-based programme design and reporting in future revisions of their pest management strategies. It will aid specifically in:

- Guiding the level of investment in pest management at both central and local levels to ensure it is appropriate and targeted in the right places over time
- Monitoring the effectiveness of pest management strategies and approaches across organisations, so that any inconsistencies can be identified and risk and impacts minimised
- Ensuring that learning is captured and communicated among pest management organisations to drive improvement over time
- Facilitating reporting and accountability in the pest management sector

The PMF will be applicable to central and regional government agencies involved in pest management and also to the primary production and other industry sectors where the impacts of pests, including the costs of their control, are likely to have a significant effect on the sustained growth of the sector.

2.2 Regional context

The Local Government Act 2002 obliges territorial authorities to identify, monitor and report on progress towards community outcomes and to describe through their long-term plans how their own activities will contribute to these outcomes (Killerby 2006). The Office of the Auditor General (2008) noted ‘weaknesses’ in LTCCP audits related to: ‘a lack of a logical flow in performance reporting; levels of service, and performance measures and targets; and outcomes monitoring.’ This is particularly so in pest management, where both regional councils (Envirolink project HZLC 56) and MAFBNZ (Jones 2008, 2009) have reviewed the current state of performance measurement and the extent of outcomes measurement and reporting by regional councils. These reviews concluded that there is significant need to improve:

- a. The extent of outcomes monitoring of programmes and the alignment of their associated measurement, methodology and design with current best practice
- b. Consistency in methods and standards of outcomes monitoring reporting
- c. Consistency in terminology and processes for defining outcomes across and within agencies

Although most RPMS follow the Biosecurity Generic Guidelines Group’s (2005) recommendations around pest classification to some extent, the strategies themselves vary in their structure and degree to which they link programme activities to outcomes for both pest-affected sectors and for the wider community. This leads to inconsistencies in the quality and quantity of reporting to the full range of stakeholders. The justification for planned activities and intended outcomes of a programme are rarely all defined. A whole-of-programme perspective is often difficult to obtain because explicit links to relevant operational/annual plans and reports are not always made clear.

There is a clear need for councils, on ratepayers’ behalf, to make more explicit, and demonstrate and communicate more effectively, the links between programmes and the contribution those programmes’ outputs make to the broader scale community outcomes being sought. The adoption of an outcomes-based approach using intervention logic models as a backbone would allow councils to: ensure programmes are achieving their goals most cost effectively; report performance clearly to internal and external stakeholders; and, contribute to and align with the national PMF for pest management.

3 Performance measurement: an overview

3.1 Why measure performance?

There are two main reasons for monitoring the performance of a programme: accountability and progress measurement. Accountability to ratepayers, taxpayers and political representatives is particularly important for the public sector. In recent years there has been an increased emphasis on public accountability for the levels of service to stakeholders in return for the rates and taxes imposed by government. Until the early 1990s, public agencies' measurement and reporting of achievement was almost entirely compliance- or activity-based. Rules were followed and work was done with little or no indication of what progress had been achieved relative to what was planned.

In recent years, performance measurement has meant a shift in focus away from whether or not outputs are being delivered, to the harder question about whether those outputs are actually contributing to high-level system outcomes and whether the approach taken is the most efficient and effective way to achieve those outcomes (Schacter 1999). Furthermore, retrospective analysis of 'value for money' helps to guide future planning and expenditure.

If done well, performance measurement is also a credible way of explaining why time and resources are being expended now for uncertain benefits in the future, which is of particular relevance to pest management interventions where the outcomes may not be realised for a period of years.

Measuring performance can also help guide managers to improve the operation and, accordingly, the success of programmes. It can also inform 'stop-go' points at which a programme can be assessed before proceeding to a subsequent stage, and 'stopping rules', such as when a pest eradication strategy can be demonstrated as ineffective, the pest reclassified and resources redeployed where they would be more effective. These points are summarised in Box 1.

The performance measurement process is, ideally, the simple and logical linking of a hierarchical structure of inputs and activities (or 'interventions') leading to measurable outputs, which in turn influence intermediate and longer-term changes in the state of a system, or 'outcomes' (See Table 1 for definitions of terms). This structure is commonly envisaged in the form of an ILM that consists of a graphical representation of the links between various levels of the hierarchy and can be accompanied by written details of links to agency goals, methods to be used, and any risks and assumptions associated with the programme (Figure 1). The model is read from bottom to top and each linking arrow represents an 'if ... then ...' statement. Thus if an activity is carried out, it is reasonable, and logical to assume that the associated output will result, and so on up the chain of logic. Ideally, each step should be defensible based on robust evidence rather than weaker anecdotal assumption. While such evidence need not be presented in programme documents such as RPMS, the management agency would be wise to record it somewhere in case the programme's logic (and thus its cost) should ever be challenged.

Box 1 Benefits of performance measurement

Performance measurement facilitates accountability between agencies and stakeholders and allows agencies to demonstrate their contributions towards desired outcomes. Other motivating factors include programme improvement and, in pest management, ethical considerations involved with lethal control of animal pests and the provision of evidence to stop an ineffective strategy.

Generic aims of a Performance Measurement Framework (PMF):

- Enable understanding of the contribution of outputs to the achievement of desired outcomes
- Monitor and report on progress
- Track effectiveness of programmes over time
- Inform critical decisions on resource allocation and service delivery
- Enhance programme planning, design, implementation and analysis
- Provide explicit acknowledgement of risks and external factors likely to affect programme success.

Furthermore, a PMF can aid agencies to:

- Inform others about the progress being made towards outcomes
- Build a more robust evidence base upon which decisions can be made
- Base strategic planning on clear goals and a defensible view of performance
- Define and refine intervention strategies
- Have confidence that major outputs are delivered efficiently, and work effectively

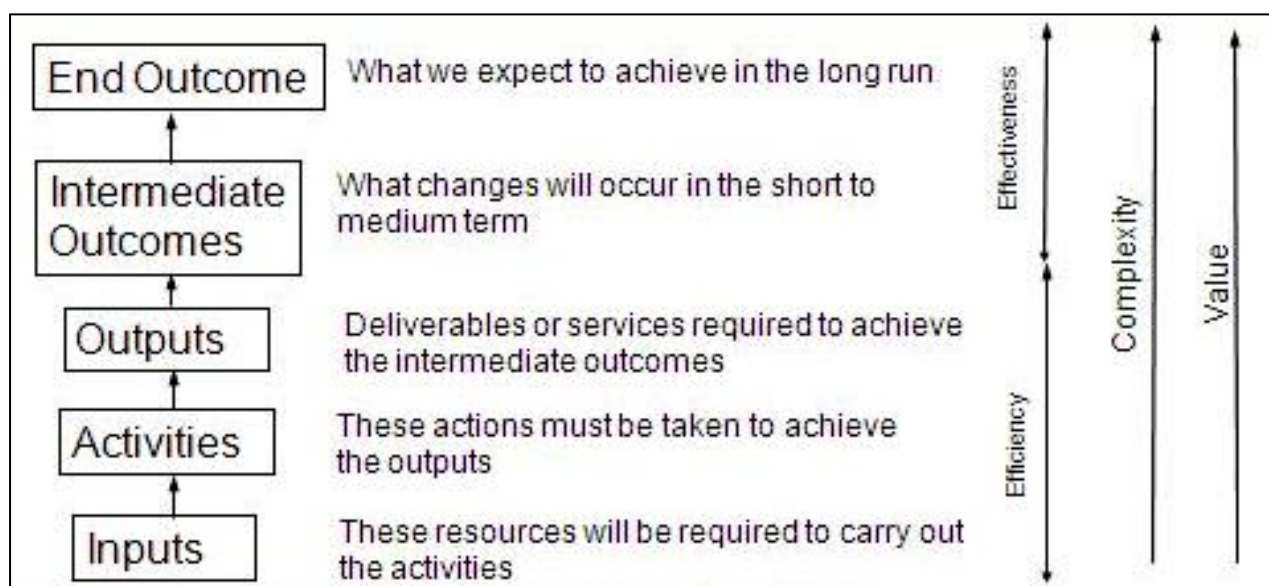


Figure 1 Simple logic model structure showing the links between a programme’s inputs (funding, equipment) and the intended outcomes.

Use of intervention logic principles can lead managers to acknowledge formally any uncertainties in the logic on which a programme is designed. This can help to identify where more research is needed and can lead to the direct use of data from monitoring to guide improvements in programme design.

The example in Figure 1 shows the simplest form of intervention logic model (ILM). In reality, a number of activities and their associated outputs will likely contribute to the achievement of an outcome. Conversely, an activity–output pairing may contribute to more than one outcome. Some of the examples in Section 7 will illustrate this point graphically.

In developing a set of linked ILM for a document such as an RPMS, it is likely that there will be some degree of repetition of some elements of the models: similar activities will be carried out to control similar pests in order to achieve common outcomes. It may therefore be useful to use a generic ILM for a class of pests or weeds. Similarly, the core assumptions and risk factors for many pest management programmes will be the same and it may therefore be acceptable to list these for a group or class of pests rather than for each species separately.

Once a logical framework has been constructed for a programme, it is necessary to develop a suite of performance indicators. It is typical to assign at least one, but no more than three measures for each output or outcome level of the programme. These would generally be quantitative, but a combination of quantitative and qualitative indicators may be used. If qualitative indicators are used, it is advisable that they are summarised on a formal rating scale, and supported by a scoring guideline to remove evaluator bias, to allow comparison over time. Performance measures at the activity or output levels of the hierarchy are essentially counts of the numbers of activities carried out or the number of things produced by those activities.

Table 1 Glossary of terms to be used in the national performance measurement framework for pest management

Term	Definition
National Outcomes	Desired end state from pest management in New Zealand and linked to high-level governmental priorities
Outcomes	The results experienced by the community from a combination of agency interventions and external factors. Outcome is a general term used to describe the <i>state</i> or change in state of a condition of significance to the community resulting from a combination of agency interventions and external factors. Information about outcomes provides a rationale for establishing agency outputs and committing expenditure to activities.
Outcome Indicators ^a	These measure the prevailing state in a given period for a specific group. They do not show causal links between outputs and outcomes.
Intermediate Outcomes	A more specific intermediate state that feeds into an outcome. Intermediate outcomes are expected to lead to a desired outcome, but are not the ultimate end result sought. Intermediate outcomes are often used to inform operational or management decisions, and are especially useful when delays in measuring outcomes are significant or limit timely response.
Intermediate Outcome indicators ^a ('impact measures')	These indicators measure the difference we have made by the delivery of outputs – the impact that we are having. These measures focus on <i>effectiveness</i> .
Outputs	The goods or services that are produced by a department/agency.
Output performance measures ^a	These focus on delivery in the field. They provide information on <i>efficiency</i> of operations and delivery (the ability to do the same work to a consistent standard continually over time)
Inputs	The resources (such as capital, personnel, accommodation, equipment, information and time) used to produce outputs and to achieve outcomes
Activities	Actual interventions undertaken by agencies to achieve specified outputs. An output is made up of a number of activities: e.g. in DOC, the activity of 'Animal Pest Ground Control' when combined with the other activity of 'Animal Pest Aerial Control' makes up the output of 'Possum Control'.
Methods	Activities are made up of a number of methods, e.g. trapping, hand-laid bait, and bait-stations in the DOC activity of 'Animal Pest Ground Control'.
Monitoring	Monitoring is the measurement of change in a natural environment, e.g. the abundance and condition of weed and pest populations over time. Monitoring enables staff to evaluate progress of programmes.

^aNote: 'indicators' vs. 'measures'. The term 'measures' refers to the direct quantification of deliverables in answer to questions such as 'how many', 'how much', 'how quickly', etc., whereas 'indicators' are measures chosen to represent a state or change of state in a wider system or community.

Selection of appropriate performance indicators can be based on a set of principles, which can be summarised as:

- Avoidance of ‘perverse incentives’ – emphasis on some potential measures may actually conflict with end or intermediate outcomes (e.g. using speed of data collection as a performance measure. This could lead to errors in potentially more important measures such as accuracy or precision of data collection).
- The indicators must have a direct logical link to the end outcomes as well as to inputs of the programme (i.e. the change in the indicator must be related directly to the magnitude of both the management action and the resultant change in the system).
- Scale – indicators must represent the spatial and temporal scale of the programme, e.g. annual reporting of activity and output data, with progress towards end outcomes reported over longer timescales.
- Cost–benefit trade-offs – in general, those indicators at levels closer to the end outcomes of the programme will be more expensive to measure compared with those reporting on inputs and activities, but may be more indicative of higher level progress.
- Ease of data collection, analysis and robustness of possible inferences.

3.3 Common challenges: time-lag and attribution

Two of the most significant challenges that must be addressed in designing a logic framework for a programme are time-lag and attribution. High-level, ultimate outcomes for the public sector tend to be achieved gradually, sometimes over many years. On the other hand, performance reporting is usually needed comparatively regularly (e.g. quarterly, annually). The challenge is therefore how to show meaningful progress towards high-level outcomes over relatively small time frames. A good approach to address this is to break the end outcome down into different levels (e.g. intermediate outcomes) that better allow demonstration of shorter-term progress.

Many programmes are initiated by local and national authorities without the facility for comparing the outcomes with what would happen in the absence of the programme (i.e. an ‘experimental control’), thus limiting a manager’s ability to attribute an outcome to the programme’s activities. This is particularly true of complex systems, such as those encountered in natural resource management, where a number of factors, including a programme’s activities, may influence an outcome. These problems can be overcome by:

- i. Having robust, justifiable and transparent links in a programme’s logic hierarchy (i.e. can an effect be reasonably assumed based on prior evidence?)
- ii. Focusing on intermediate outcomes that can be attributed directly to programme activities at a measurable timescale
- iii. Using a formal statistical analysis of attribution (e.g. based on regression methods)
- iv. Using qualitative measures of progress.

3.4 Key points

In summary, effective performance measurement consists of the following key steps:

1. Programme outcomes are defined in advance in line with agency policies and aims.
2. Clear links are made between interventions and expected outputs and outcomes.
3. Indicators and measures of performance are used to gauge programme progress.
4. Performance measures are used to (a) provide feedback which, in turn, guides programme improvements, and (b) report performance clearly and effectively to stakeholders.

4 Performance measurement of regional pest management programmes

4.1 Current state overview

Three recent reports have assessed the current state of pest management outcomes-based measurement and reporting by regional authorities. This section summarises those publications and others to identify gaps between current and best practice.

A current-state review (Jones 2008) found that measurement of pest management performance in New Zealand was undertaken using various and inconsistent methodologies, frequencies, and levels of resolution across the range of management agencies. In addition, there were inconsistencies in the use of terminology and in processes for defining desired outcomes from pest management. Together, these made it impossible to gauge the performance of many agencies towards those outcomes in any common metric or at a national scale. These general findings are in keeping with international evaluation reviews that point out that, of the relatively few attempts at evaluating natural resource management programmes, most concentrate on the achievement of initial actions only (Bellamy et al. 1999; Olsen 2003).

The review found that the expected benefits from regional authorities' activities have been defined mainly by operational outputs rather than measures of changes in the assets that suffer pest impacts (i.e. outcomes). Explicit links between the activities carried out as part of pest management programmes and the changes that those activities were intended to make to community values were not common. Clear programme 'stories' (Segnestam 1999; Mayne 2004), in which activities, outputs and outcomes are all reported together, were not found. The most common pattern was for some details of a programme to be described in one publication, but for others to be spread across other reports. To find the details for an individual programme could involve reading up to four or five different publications. A typical 'trail' would start with an RPMS and LTCCP, followed by a recent Operational Plan, the corresponding Report on an Annual Plan, the council's Annual Report and also one or more internal reports to council, where available. Thus, activities, outputs and outcomes (where they existed) are often described in separate documents and measures in yet another. Programme management could be simplified greatly and made clearer to all stakeholders by

the use of the ILM format, with explicit links made to relevant strategies, operational plans and reports at each level of a model.

Reporting is heavily biased towards activities and outputs. Progress is most often described by means of narrative ‘highlights’ or in terms of categories of achievement against objectives. As the objectives are mostly activity-based, failure to achieve is uncommon. In some cases, claims of success are made with no reporting of evidence to support the claims. Although it must be acknowledged that different readerships (ratepayers, industry, councils) require different subsets of information, it is difficult to gauge a programme’s progress towards stated objectives from a single source. Where outcomes are reported, this is generally in the form of ‘case studies’, with little indication of whether the case cited is indicative of a general trend.

Subsequent to the current state review, two more detailed analyses of regional authority pest management programmes were reported which looked at the alignment of a range of individual programmes with best practice performance measurement (Jones 2009) and at the amount and quality of outcome monitoring carried out by councils (Clayton & Cowan 2009). Both studies confirmed that while monitoring and reporting of activities and outputs was common, outcome monitoring varied widely between regional authorities. The results of the output monitoring were linked only occasionally to the desired outcomes for that programme or to the wider community outcomes for the region.

Clear links between activities and outcomes are required to provide unequivocal, objective evidence of progress against pests. Many programmes appear based on the premise that, ‘activity X will lead to outcome Y, so that the more X is done, the more Y will be achieved’. This linkage is not commonly articulated clearly nor is it defensible given that such relationships are unlikely to be linear. Unless end and intermediate outcomes, and their associated progress measures, are made explicit, it is unclear how value for expenditure can be demonstrated to increasingly aware ratepayers, council or to central government. The shift in emphasis to site-led pest management programmes is leading to more explicit identification and monitoring of outcomes (often by proxy, as community groups are made to state these as part of funding applications), but species-led programmes are still largely run and assessed in terms of activities.

The shifting emphasis to outcomes for regional values (economic, environmental, social, cultural) in regional authority planning and reporting, as expressed in recent iterations of Long-term Council Community Plans (LTCCPs), is becoming linked formally to pest management. Recent examples include Environment Bay of Plenty’s linking of activity groups (biosecurity and biodiversity are part of the ‘Sustainable Land Management’ group) to Community Outcomes in their 2010-11 Annual Plan. The equivalent Environment Canterbury document and the current LTCCP also make these links explicit and, in addition, list key uncertainties and assumptions that may affect performance. Output performance measures and trends therein are also described. The next step requires these linkages to be made explicit in RPMS documents and for the gaps between listed activity groups and community outcomes to be filled to provide, for each programme, a clear, logical sequence that can be used to justify activities, acknowledge the contribution of their outputs to community outcomes, and to facilitate clear performance reporting at all levels. This can be achieved effectively and efficiently using ILM.

4.2 Current RPMS structure

In this section, the current generic RPMS structure is reviewed with the aim of identifying where the gaps noted in the previous sections could best be addressed.

To aid authorities in preparing RPMS for review, the Biosecurity Generic Guidelines Group (BGGG 2005) produced a guide to obligations under the Biosecurity Act and Resource Management Act. Most RPMSs follow these guidelines to some extent and, accordingly, many of the 20 operating strategies are based on a common structure with variations imposed by regional management and funding priorities. The BGGG guide noted that there had been no consistent approach to RPMS format and content and it was unlikely that a standard template would be followed exactly, but one was provided as an example. It was further noted that it might be helpful to determine common features of existing RPMS to aid development of a better model in the future.

The BGGG guidelines outlined a common RPMS structure, of which some sections are relevant to aligning strategies with outcome-based principles. These include:

Part 1: Introduction and background. This generally outlines background information such as the purpose, scope and structure of the strategy, the statutory and planning framework relevant to the strategy, and management roles and responsibilities under the strategy. This section also outlines the likely effects of the strategy's implementation on Māori values, the environment and overseas markets. This is the point at which pest management programmes could be linked explicitly to the overarching Community Outcomes for the region as stated in the current LTCCP. This linkage would provide a point of reference for the alignment of individual pest management programmes (as described in the following sections) with the 'big picture' aims of the regional authority.

Part 2: Pest management programmes. This sets out the management regime for each pest including a description of the problem caused by the pest, the 'objective(s)' of the programme, the means of achievement, relevant strategy rules, and the monitoring methods to be used. The description of the problem – including the location, distribution, spread and impacts of the pest – may be used to define the specific outcomes hoped for from the management of that pest (or group of similar pests).

It is here that pest programme outcomes can be defined by considering what the system state (economic, environmental, social, and cultural) would be in the absence of the impacts of the pest (see Appendix 1 of this report for a brief guide to outcome definition). The types of impact that are generally taken into consideration are listed in the Biosecurity Act as:

(i) Economic well-being;

(ii) The viability of threatened species of organisms, the survival and distribution of indigenous plants or animals, or the sustainability of natural developed ecosystems, ecological processes and biological diversity;

(iii) Soil resources or water;

(iv) Human health or enjoyment of the recreational value of the natural environment;

(v) The relationship of Maori and their culture and traditions with their ancestral lands, waters, sites, waahi tapu, and taonga.

The BGGG (2005) noted that some ‘strategy objectives’ were not achievable, either because of unrealistic expectations of what could be achieved in five years (e.g. eradication) or measured reliably (e.g. goal-statements that were not specific, time bound, or linked to feasible monitoring methods). It is worth noting that the term ‘objectives’ may refer to activity or output objectives as much as to outcomes of pest management. The guidelines went on to note that, when reviewing their strategies, regional councils may find that they do not always have the necessary information to determine whether the strategy objectives have been achieved.

To address any shortcomings with previous strategy objectives, the BGGG recommended that strategy objectives and monitoring techniques need to be seen as a package rather than in isolation and *‘through monitoring and the appropriate reporting on the achievement (or otherwise) of strategy objectives, regional councils are able to gauge their performance and identify any issues that need to be addressed in future reviews.’*

This approaches current best practice advice on linking the various steps in a programme to outline the logical flow from activities to end outcomes, but the BGGG went on to advise, *‘Objectives do not have to include what value (e.g. agricultural production, conservation, human or animal health) is being protected. This will be stated in the reasons for the pest being included in the strategy’*. This point illustrates the difference between an output-based performance paradigm and the shift over the past few years to outcomes-based programme design and performance measurement. The BGGG advice, if followed, means that the value of the pest management programme to the community is not able to be assessed because there is often only an indirect link made between outputs and the desired outcomes of pest management.

Part 2 of the common strategy format also contains information on the ‘means of achievement/alternative means’, which comprises a list of management options to be used in meeting an objective. These could easily be regarded as ‘activities’ under the ILM approach and are already measured generally by regional authorities.

Another key component of Part 2 is the description of methods for monitoring achievement of objectives. The BGGG guidelines state:

It is preferable to also monitor what impact the pest and its control is having on the resource being protected. However, such monitoring is difficult when non-market values like native forest are being protected. Consequently, to date, regional councils have strongly relied on operational and output monitoring, such as the number of pests killed or the number of inspections undertaken. Despite the lack of defensible links between an operational monitoring index and the resource being protected, such monitoring is often the most cost-effective approach that regional councils have at present.

Again, a similar point to that regarding community values, above, can be made here with regard to justifying expenditure on pest management with no measure of progress towards outcomes being made. The level of investment into monitoring a programme’s outcomes is clearly an issue that most managers will be confronted with. As a general rule, it is likely that

this investment should reflect the overall value of a programme compared with other programmes.

The common strategy guidelines go on to advise:

...the monitoring of pest objectives and performance measures must be simple and cost-effective to use because of the very large numbers of pest species regional councils are likely to include in their proposals for a reviewed strategy. It is unrealistic to expect regional councils to make a detailed assessment of each suspected threat. Accordingly, there is likely to be a trade-off between scientific rigour and practicality when identifying particular monitoring techniques to be included in those proposals.

This is an important point as it is clearly impossible to measure and report on every activity, output and intermediate outcome in RPMS. Some guidance on the selection of key performance indicators is given in Section 6.1, below.

Part 3: Strategy administration. This outlines the strategy's funding, integrated management, monitoring and administrative provisions. The BGGG (2005) advice notes:

Under sections 76(1)(f) and (g) of the Act, regional councils, as pest management agencies, are required to specify in their Proposal the methods to monitor Strategy objectives. If a Strategy's objectives are vague or immeasurable it is very difficult to gauge the effectiveness of the council's performance and whether objectives are being achieved. To enable a review of a Strategy, regional councils need to provide clear and measurable objectives. Regional councils must also identify and link monitoring methodologies with those objectives/performance measures.

This advice is highly relevant to recent developments on measuring programme performance, except that the onus has changed from a focus on activities and outputs as measures of performance to emphasising performance towards the outcomes from pest management. It is worth noting again that the term 'objectives' may refer to activity or output objectives as much as to outcomes of pest management. Reporting against any of these meets the requirements under the Act, but only by reporting on progress towards outcomes can an assessment be made of whether the activities are making any difference to the community or natural environment within the region, or of progress at a national level.

5 The template

In this section, the current RPMS for Hawke's Bay is used as a basis for developing a template based on intervention logic models for programme design, performance measurement and reporting.

Note: the incorporation of outcomes-based methods, particularly the ILM approach, would involve modifications to only some components of the general strategy structure. Accordingly, only such components of the strategy are considered below.

5.1 Suggested amendments to align the strategy with outcome-based measurement and reporting

Excerpts from the current Hawke's Bay Regional Council RPMS are in italic font and are direct quotations from that document.

5.1.1 HAWKE'S BAY REGIONAL COUNCIL RPMS PART ONE

Glossary of terms – the standard terminology shown in Table 1 should be included as part of the glossary.

1.2 Strategy goal

The Strategy contributes to both a clean and healthy environment and a prosperous region by reducing the threat from plant and animal pests on the region's biodiversity and economic prosperity.

The link between the activities to be carried out under the strategy and the Community Outcomes for the Hawke's Bay Region, as listed in the current LTCCP, should be made explicit here, either instead of, or in addition to, the goal statement, e.g. through a linking statement such as, 'Pest management activities carried out under this strategy contribute to the following Community Outcomes for the Hawke's Bay region:

- A strong, prosperous and thriving economy
- An environment that is appreciated, protected and sustained for future generations'

1.3 Objectives of the strategy

1. To reduce the density and extent of pests in Hawke's Bay;

2. To increase the awareness of the Hawke's Bay public of the need to recognise and control pests; and

3. To ensure pests listed in this strategy are not imported to the region, sold or distributed.

1.4 Strategy structure

This Strategy is set out in three parts:

Part I: *provides an introduction to the Strategy. It contains a summary of the legislative framework, and the roles and responsibilities of the various parties involved in pest management.*

This section should also describe how pest management activities contribute to Regional Community and National Outcomes. Note that this link is mentioned in the 2009 Hawke's Bay Regional Council Annual Report, e.g. for pest animals the report notes:

Activity 1 – Animal Pest Control (Project 360)

This activity contributes to a clean and healthy environment by reducing the impact of pests on our region's biodiversity and natural resources. It contributes to a prosperous region by providing advice and assistance to land occupiers to reduce the effects of animal pests on their property and livelihood.

Part II: *lists the pests managed under the Strategy. The management regime for managing these pests is set out. This includes a description of each pest; the Strategy Objective(s) to be achieved; and the tactics required to achieve the Strategy Objective(s), including any rules for controlling each pest.*

This paragraph should be reworded to ensure consistency with agreed national terminology (Table 1). It should note that, for each pest, or category of pests, the desired outcomes from management will be listed, along with performance indicators and links to relevant reporting media such as annual reports on operational plans.

Part III: *sets out the procedures for enforcing, funding, and monitoring the Strategy.*

1.5 Statutory framework

5.1.2 The Biosecurity Act 1993

The Biosecurity Act deals with the exclusion, eradication, and effective management of pests and unwanted organisms. The Biosecurity Act places no requirement on regional councils to conduct pest control. Rather it sets out the manner in which a Pest Management Strategy must be conducted, should a regional council choose to develop one. To develop a Pest Management Strategy the Council must consider that doing so is the most effective and efficient course of action.

A sub-section should be included at this point to make explicit the link between regional pest management activities and National Outcomes and Intermediate Outcomes from pest management. This would show how regional programmes contribute towards national outcomes (as listed in Appendix 2).

5.1.3 HAWKE'S BAY REGIONAL COUNCIL RPMS PART TWO

Section 3 Pests to be Managed

3.1 Introduction

This section lists the pests and sets out the management regime for managing them. For all pests the following is provided:

- *A description of the pest*
- *The Strategy Objective to be achieved*
- *The management regime to be used to achieve the Strategy Objective, including any occupier rules.*

The current approach alludes to the changes that are hoped for from managing each pest or category of pests, but does not make explicit the links between action and outcome. To address this, an intervention logic model should be developed for each pest or group/category of similar pests showing the links between the activities carried out by council staff or others (e.g. landowners) to control the pest, the outputs from those activities and the intermediate and longer-term outcomes from the programme. For each of these, a performance indicator or measure should be given together with a specified time-frame appropriate to the expected change in each indicator. This should be accompanied by a description of the assumptions and risks associated with each pest-specific programme and also by information on where, when and how the performance data will be reported. Use of a single model for groups of pests within a category that have similar impacts (e.g. Total Control – service delivery plants that are managed to preserve economic values) would reduce the number of individual model graphics and associated information sets required. It is also likely that pest programmes will contribute to common outcomes (using similar indicators and measures), which can be replicated across models.

The type of information that would need to be included for each pest (or group of pests with common attributes) is suggested in graphical format in Figure 2. Note that, for the purposes of the RPMS document, inputs to each programme are not described. This type of agency-specific operational detail would add little to the community's interpretation of the strategy and may be best included in internal council documents, provided those are clearly linked to other levels of the relevant ILM.

Some pest programmes may involve a number of groups of activities such as direct control, monitoring and community engagement which, in turn, may lead to a number of outputs and intermediate outcomes. The graphical representation for such a programme may appear quite complex and such detail may be best placed in an appendix to the main body of the RPMS document. If this is the preferred option, the essential features of the programme could be summarised in a table beneath the description of each pest as in the example in Table 2.

The process described above for pest-led programmes applies equally to site-led programmes. The latter are generally carried out to protect biodiversity values and would therefore contribute to a single Community Outcome. Depending on the complexity of the site-based management, the lower levels of the ILM graphic may contain more activities and outputs than that for a pest-led programme, as multiple methods may be used to control multiple pests within a site and the programme may also include significant community engagement activities.



Figure 2 Basic structure of an intervention logic model for a regional pest management programme. The model is read from bottom to top and arrows or connecting lines can be added to show linkages between lower- and higher-level components.

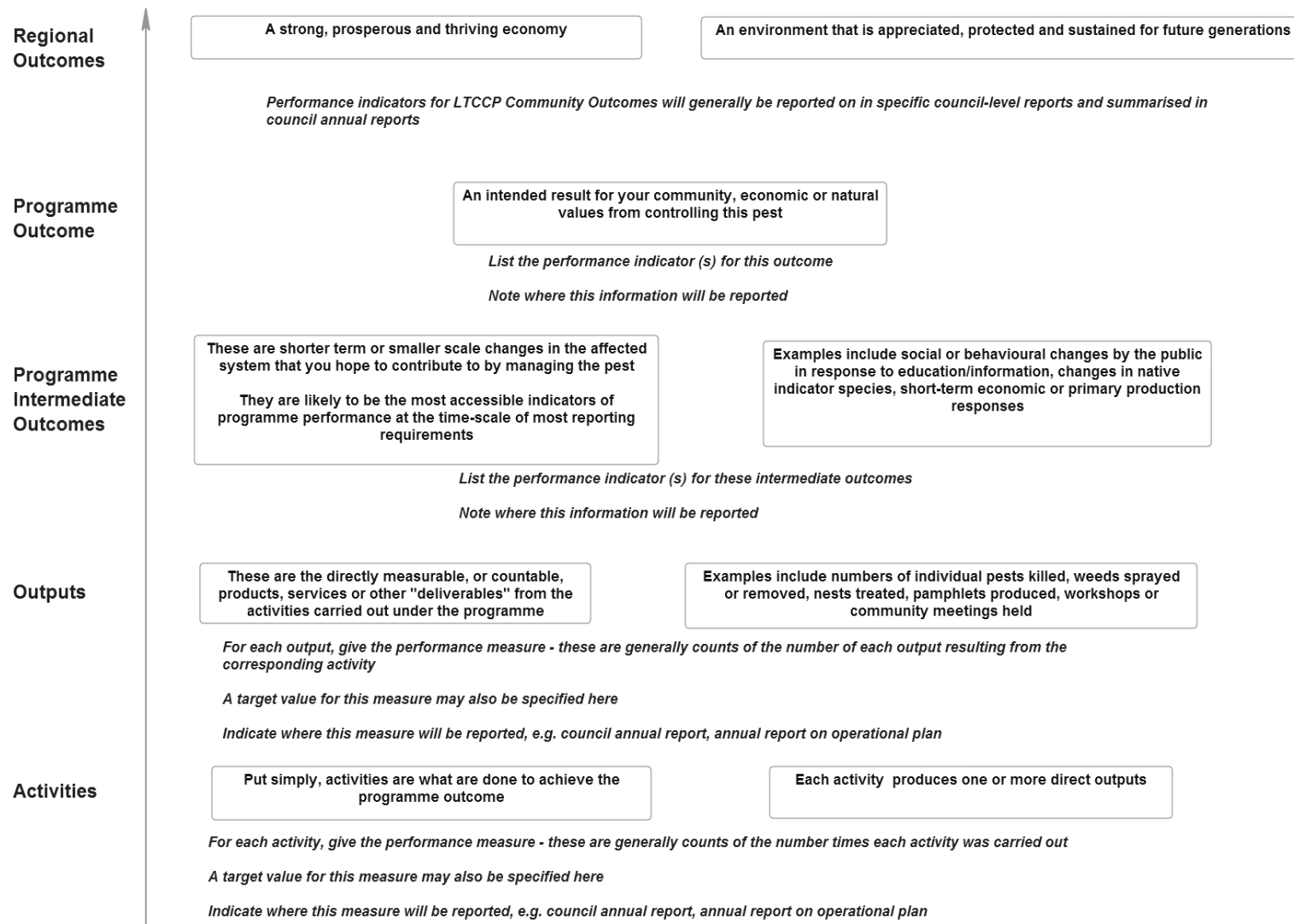


Figure 3 Adding indicators and reporting links to the intervention logic model.

Table 2 Programme summary table based on the Hawke’s Bay Regional Council regional possum control programme

		Performance measure	Target value	Reported in:
Community (LTCCP) Outcomes	A strong, prosperous and thriving economy			
	An environment that is appreciated, protected and sustained for future generations			
Programme Intermediate Outcomes	Primary production increases by \$x/ha over the possum control area	Pasture dry matter yield/ha		
	Landowner costs of possum management are lower than pre-programme	Aggregated landowner expenditure on possum management		
	Integrity of ecosystems is protected and enhanced at sites of high ecological value	Proportion of managed sites showing improvements in indicators of ecosystem health		
	Hawke’s Bay residents are aware of biosecurity risks of possums and participate in pest management activities	Environmental awareness survey		
Outputs	Possum control	Area under sustained control or RTCI at sites		
	Public education and engagement	Numbers of, e.g. web page hits, visits to workshops, brochures requested, media articles		
Programme Activities	Bait stations set and maintained	Number of		
	Trap-lines set and maintained	Number of		
	Visits to landowners	Number of		
	Workshops held	Number of		
	Production and distribution of educational materials	Number of		

5.1.4 HAWKE'S BAY REGIONAL COUNCIL RPMS PART THREE

Section 13 Monitoring and Review of the Strategy

13.1 Monitoring progress

Hawke's Bay Regional Council will monitor progress on implementing this Strategy to ensure that the objectives can be achieved. This will be done by:

- 1. Producing maps of properties showing plant pest infestation levels and the extent of the infestation;*
- 2. Establishing and maintaining a complaints and enquiries register;*
- 3. Monitoring the extent and effect of pest infestations; and*
- 4. Undertaking inspections to determine whether occupiers are meeting their obligations under this Strategy, and recording the overall level of compliance.*

13.2 Performance of the Management Agency

Under section 85 of the Biosecurity Act, Hawke's Bay Regional Council, as the management agency, must prepare an annual operational plan and an annual report on the operational plan and its implementation. These requirements will be incorporated in Hawke's Bay Regional Council's Annual Plans and Reports prepared under sections 95 and 98 of the Local Government Act 2002.

Assessment of Hawke's Bay Regional Council's performance, as the management agency, will therefore be reported in the Council's Annual Reports. These reports will document the performance of Hawke's Bay Regional Council in achieving the objectives of this Strategy, including whether:

- The required pest management programmes, region-wide surveillance and control have been undertaken;*
- All nurseries and retail outlets have been inspected;*
- A complaints, enquiries and plant pest reporting register has been maintained, and follow-up action has been taken as appropriate;*
- Education initiatives and the biological control research programme have been undertaken as set out in the operational plan;*
- Hawke's Bay Regional Council's commitments in terms of service delivery, as set out in the operational plan, have been undertaken; and*
- The Strategy was implemented within budget.*

This section of the current Hawke's Bay RPMS illustrates very clearly the traditional emphasis on activities and outputs in assessing performance. Thus, performance is measured by asking whether planned activities were carried out as opposed to whether pest management made any difference to natural systems or the Hawke's Bay community.

This does not mean that recording and reporting on activities and their outputs no longer has value. These measures inform on the efficiency with which an agency carries out its work and should be viewed in this context. What is required is a set of indicators that fill the gaps in the conceptual logic pathway from 'doing things' to knowing whether those efforts have made a difference. An additional bullet point should therefore be added to the list above, such as:

- *Outcome monitoring has been carried out to demonstrate progress towards achieving Community Outcomes and the results reported.*

6 Identifying indicators and reporting on performance

6.1 Performance indicators

Developing outcome (and intermediate outcome) performance indicators can seem to be a huge and complex undertaking, especially for a suite of pest management programmes that likely contribute to a range of economic, social and environmental outcomes. Managers have to assess not only whether an indicator assesses reliably whether an outcome is being achieved, but also whether the monitoring-appropriate tools, capability and budget are available. It is impossible for most agencies to measure everything that should or could be measured. For an agency that manages a range of programmes aimed at various outcomes it is important to identify what have been termed the 'vital few' indicators that can inform a general assessment of performance. Selection of the vital few in the context of RPMS may mean selecting a set that represents the range of social, economic and environmental outcomes, or the range of pest classifications or programme types. The ability for indicators to align with those used at the national level or across regional or regional-Crown boundaries should also be taken into account.

A generic process for identifying an indicator set for an RPMS is summarised below.

1. Develop a 'candidate set' of potential indicators for assessment according to predetermined criteria as to their suitability for use. These can comprise existing indicators that programme managers consider appropriate, or new indicators that are specific to the outcome statements defined by managers. As an example, the Canterbury Community Plans group based their candidate set on a combination of the currently operating council outcome measures and similar sets from central government agencies.
2. Once a stocktake or candidate set of indicators has been identified, a set of the most suitable or key indicators must be selected from the wider potential set. Indicator selection criteria help guide the assessment of which are the best indicators. Given the complex nature of most systems and issues, the selection process is usually iterative. An evaluation process is used to assess whether potential indicators meet the agreed selection criteria. The evaluation may involve a simple yes/no assessment or may be more complex, involving a priority

weighting system where each potential measure gets a score in relation to its ability to meet the selection criteria.

In identifying and assessing indicators, the following criteria are useful:

Criterion	Explanation
Validity	Does the indicator adequately reflect performance or progress towards the outcome or intermediate outcome?
Consistent and repeatable	Can the data be obtained regularly to inform a trend?
Sensitive and specific	Is the indicator likely to be sensitive to real changes in the state of the system?
Simple and understandable	Can it be presented in an easily understandable way that is meaningful to stakeholders?
Utility	Will the indicator be useful for a range of audiences?
Uses readily available data	Are source data readily available, or are they likely to become available in the short term?
Disaggregation	Can the indicator be broken down into relevant categories?
Comparability	Can the indicator be reasonably compared with similar indicators in other sectors, both nationally and internationally?
Robustness	Is the indicator defensible to a technical audience?

3. Given that it is impossible to measure ‘everything,’ identify from the candidate set a sub-set of the vital few indicators that best reflect overall performance. Note that some indicators can be used to inform on progress towards more than one outcome.

4. Any candidate indicators excluded will be kept in reserve and may be used should any in the draft set prove to be unfit for purpose.

5. For each of the final indicators, there are two broad ways to use them to assess performance. Firstly, an indicator can be compared over time to assess whether a trend towards an outcome is being achieved. Alternatively, a target value for the indicator can be set and performance assessed against this.

6.2 Linking to reports

As noted above, clear pest management programme ‘stories’ in which activities, outputs and outcomes are all reported together are uncommon. Often, some details of a programme are described in one publication, and others are spread across various reports. Finding the details for an individual programme may involve reading up to four or five different publications. Clearly, different reports have different purposes and, accordingly, different target readerships, but to improve clarity an RPMS should specify the document where each indicator/measure, will be reported and the reporting frequency. Outcomes and their corresponding indicators should also be numbered so that the links are maintained between documents.

A further suggestion to facilitate reporting is to develop a more detailed version of Table 2 for internal council use in which indicator values are included for each measurement period. This may best be done in spreadsheet or database software. Relevant information could then be extracted from this single source as and when required for reporting.

7 Examples

Figures 4–7 show examples of ILM for a range of pest management programmes currently undertaken by Hawke’s Bay Regional Council. The models, including performance indicators, were developed for illustrative purposes only and are not yet part of any formal council policy. The models were drawn using the DoView software package (<http://www.doview.com/>).

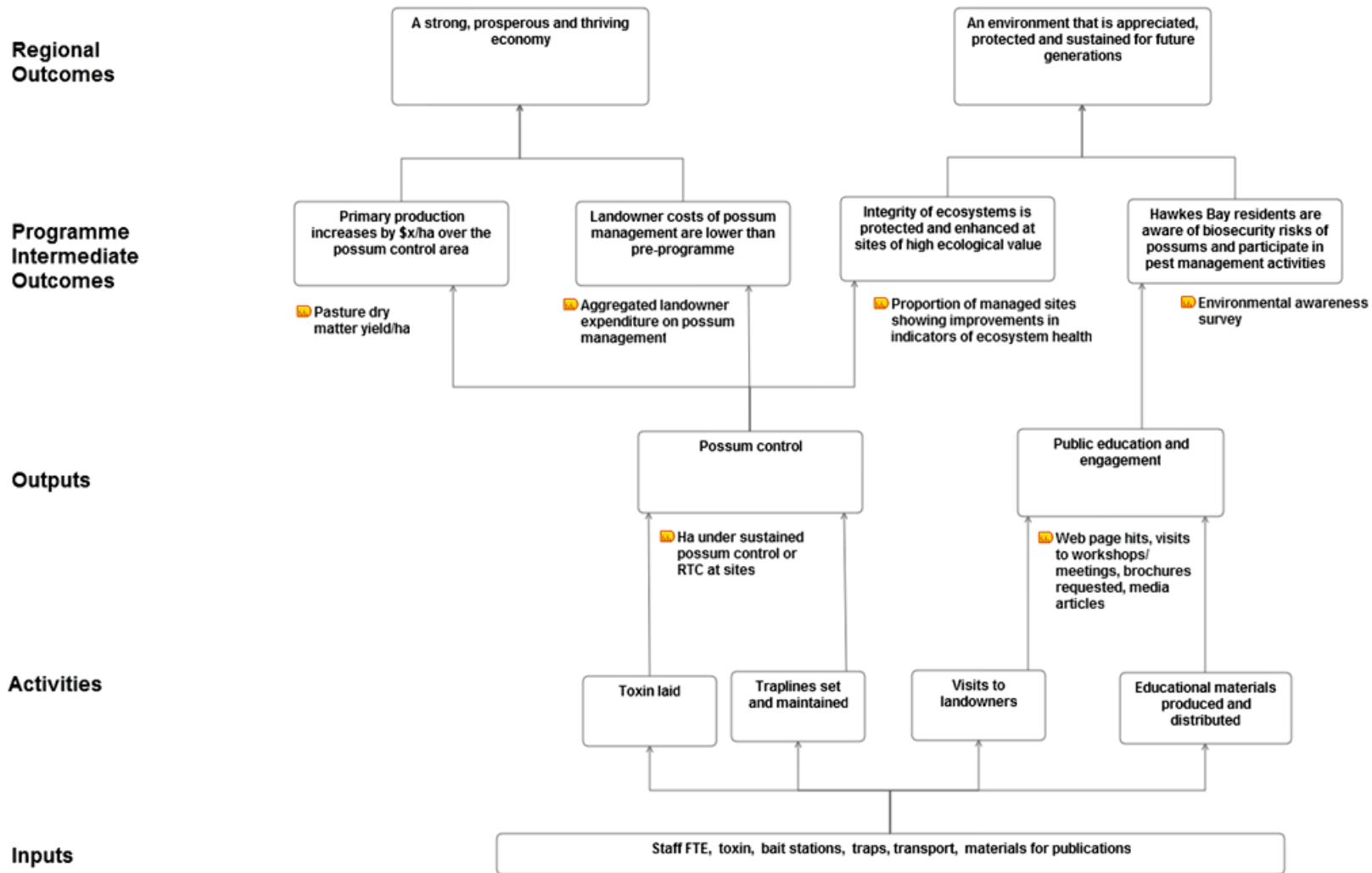


Figure 4 Intervention logic model based on Hawke's Bay Regional Council's possum control programme. Note the two main outputs, which contribute to four intermediate outcomes. Performance indicators are denoted by the yellow symbols beneath the intermediate outcomes and outputs. Regional outcomes are specified in the LTCCP.

Regional Outcomes

Intermediate Outcomes

Outputs

Activities

Inputs

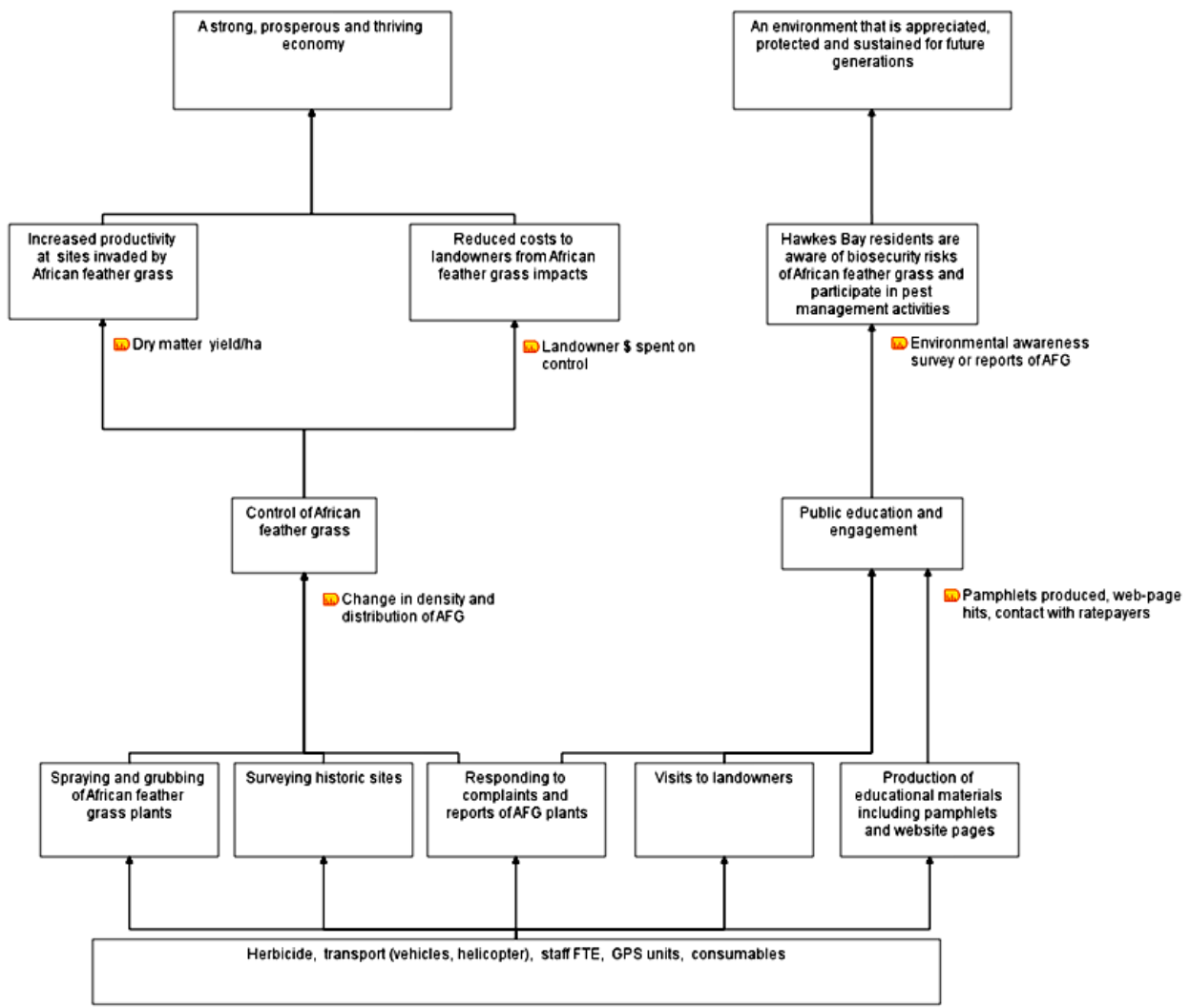


Figure 5 Intervention logic model based on Hawke’s Bay Regional Council’s African feather grass control programme.

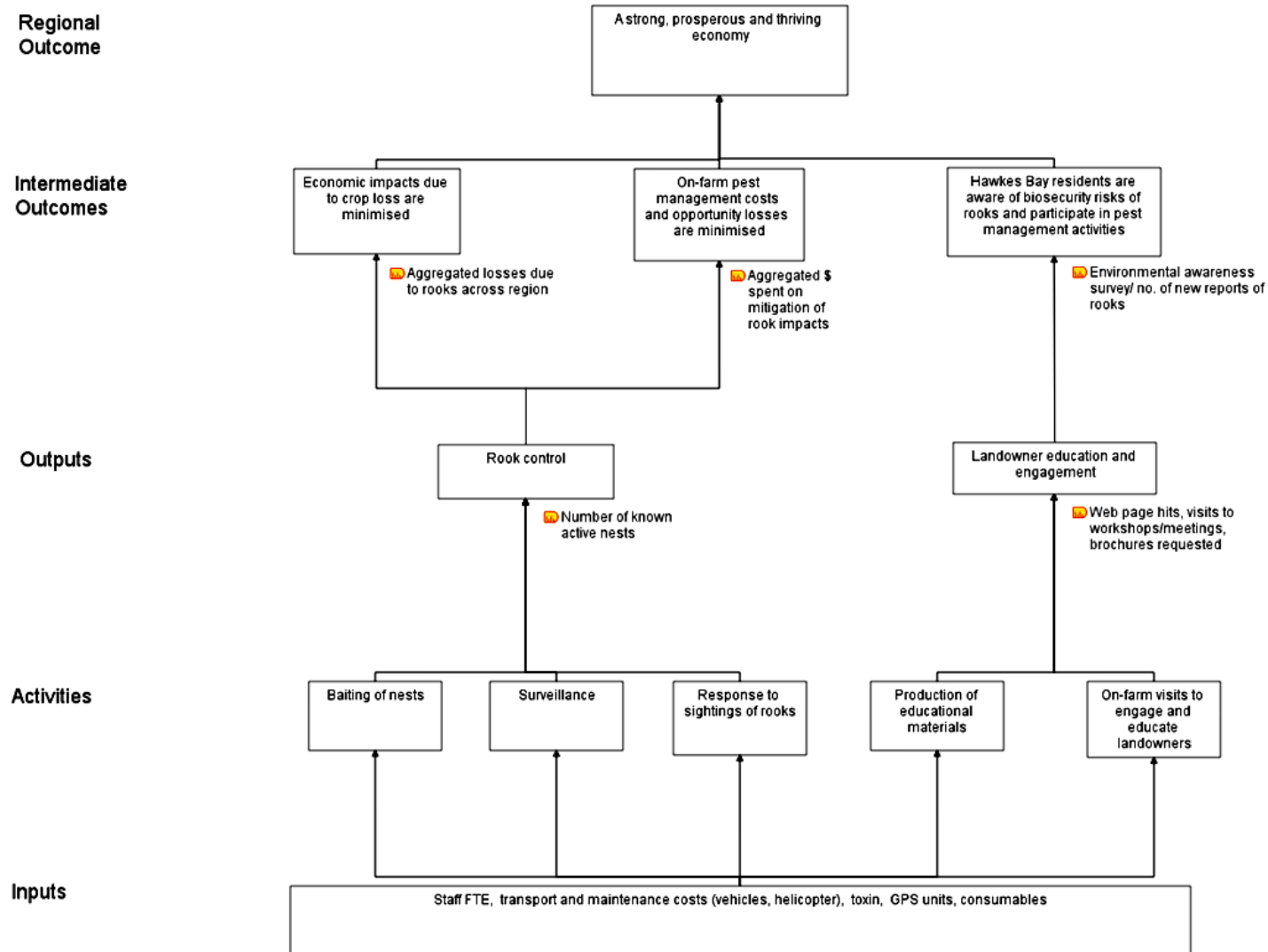


Figure 6 Intervention logic model based on Hawke's Bay Regional Council's rook control programme.

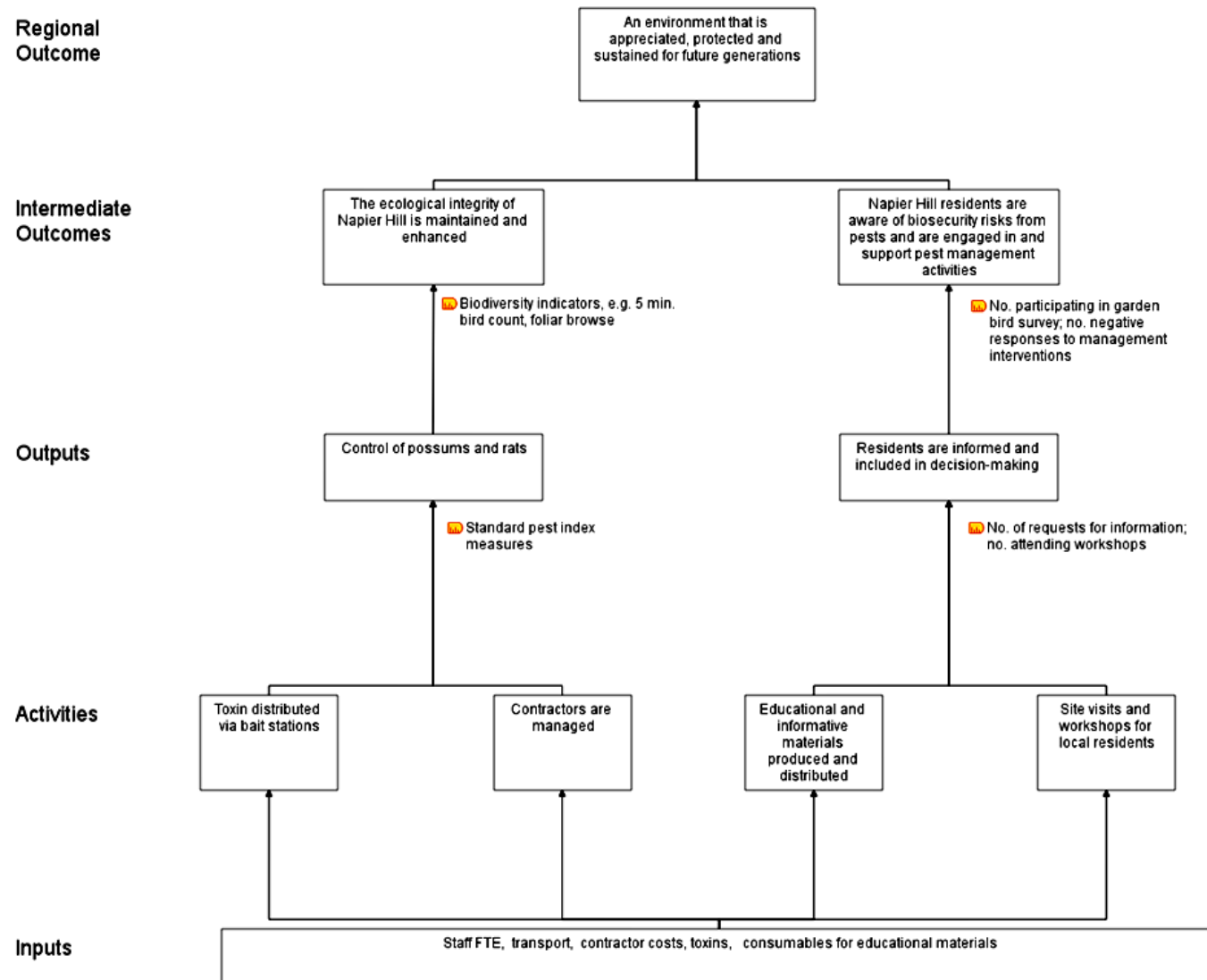


Figure 7 Intervention logic model based on Hawke’s Bay Regional Council’s site-led programme for Napier Hill.

8 Conclusions and Recommendations

There is a clear need for councils, on ratepayers' behalf, to make more explicit, and demonstrate and communicate more effectively, the links between programmes and the contribution those programmes' outputs make to the broader-scale community outcomes being sought. The adoption of an outcomes-based approach using intervention logic models as a backbone would allow councils to ensure programmes are achieving their goals most cost effectively, report performance clearly to internal and external stakeholders, and contribute to and align with the national PMF for pest management.

An effective performance measurement process can be summarised as:

1. Programme outcomes are defined in advance in line with agency policies and aims.
2. Clear links are made between interventions and expected outputs and outcomes.
3. Indicators and measures of performance are used to gauge programme progress.
4. Performance measures are used to (a) provide feedback which, in turn, guides programme improvements, and (b) report performance clearly and effectively to stakeholders.

The following amendments to the current generic RPMS structure are suggested to align regional authorities with best-practice performance measurement.

In Part 1 Introduction and background:

- The standard terminology for performance measurement (Table 1) should be included as part of the glossary of terms.
- The link between the activities to be carried out under the strategy and the Community Outcomes for the region, as listed in the current LTCCP, should be made explicit in Part 1, either instead of, or in addition to, the goal statement
- This linkage would provide a point of reference for the alignment of individual pest management programmes (as described in the subsequent sections) with the 'big picture' aims of the regional authority.
- Alongside the description of the statutory framework a sub-section should be included to make explicit the link between regional pest management activities and national outcomes and intermediate outcomes from pest management. This would show clearly how regional programmes contribute towards national outcomes

In Part 2 Pest management programmes:

- Pest programme outcomes should be defined by considering what the system state (economic, environmental, social, and cultural) would be in the absence of the impacts of the pest.

- To make explicit the links between a programme's activities and the intended outcome(s), an intervention logic model should be developed for each pest or group/category of similar pests showing the logical links between the activities carried out by council staff or others (e.g. landowners) to control the pest, the outputs from those activities, and the intermediate and longer-term outcomes from the programme.
- Some pest programmes may involve a number of groups of activities such as direct control, monitoring and community engagement, which, in turn, may lead to a number of outputs and intermediate outcomes. The graphical representation for such a programme may appear quite complex and such detail may be best placed in an appendix to the main body of the RPMS document. If this is the preferred option, the essential features of the programme should be summarised in a table beneath the description of each pest.

In Part 3 Strategy administration:

- Adequate reporting on progress towards outcomes is essential to allow an assessment of whether the activities are making any difference to the community or natural environment within the region, or of progress at a national level.
- The emphasis on reporting outcomes does not mean that recording and reporting on activities and their outputs no longer has value. These measures inform on the efficiency with which an agency carries out its work and should be viewed in this context. What is required is a set of indicators that fill the gaps in the conceptual logic pathway from 'doing things' to knowing whether those efforts have made a difference.
- Agencies cannot measure everything that 'should' or could be measured. Pest management programmes frequently contribute to a range of economic, social and environmental outcomes. Managers have to assess not only whether a performance indicator assesses reliably whether an outcome is being achieved, but also whether the appropriate monitoring tools, capability and budget are available. The focus should be on the 'vital few' indicators that can inform a general assessment of a programme's performance.
- The level of investment into measuring performance is an issue that will confront most managers. As a general rule, it is likely that this investment should reflect the overall value of a programme compared with other programmes.
- Different reports have different purposes and, accordingly, different target readerships, so each indicator/measure of performance should specify where it will be reported and its reporting frequency.

9 Acknowledgements

This report was funded by Envirolink Medium Advice Grant HBRC135 with co-funding from MAF Biosecurity New Zealand. Campbell Leckie of Hawke's Bay Regional Council provided guidance and informed comment at all stages of the work. Richard Bowman, Phil Cowan and Dave Morgan reviewed the final draft, which was edited by Christine Bezar.

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Appendix 1 – Some guidelines to defining outcomes

National and international guidance for best practice in setting and defining outcomes suggests that outcomes should describe a state, or change in state, of a system or community resulting from a programme's or agency's activities and outputs. General or non-specific terms should be avoided where possible to facilitate the clear definition of indicators of progress, as should any description of how the outcome will be achieved. If an outcome statement specifies a desired change in precise and unambiguous terms, the appropriate indicator can be defined with similar precision.

There are international standards in the definition of outcomes. Generally, it is agreed that outcome statements should be SMART:

- Specific (closely related to the theme or outcome it will measure)
- Measurable (data are available)
- Achievable (it is possible to reach targets that have been set based on the indicator)
- Relevant (to those who will use them)
- Time-bound (to identify trends)

Some examples from currently available general and sector-specific guides to defining useful outcomes serve to illustrate these characteristics in more detail:

The New Zealand government's Pathfinder performance measurement initiative describes an outcome as a:

...precise, written definition of changes attributable to the activities of one or more agencies which:

- *defines how performance will be measured*
- *relates clearly to the consequence of the agency's outputs or activities for the community.*

The Australian Natural Resource Management Monitoring Evaluation Research and Improvement programme provides guidelines for writing outcome statements, which include:

- State outcomes succinctly (about 10 words) indicating clearly what change will look like (it must say 'what', not 'how' – the 'how' is a later step).
- Use plain English words in the statement – no ambiguity.
- Define any potentially ambiguous terms.
- Remove any excess/unnecessary adjectives that could increase the difficulty of measuring outcomes.

The SSC advice paper on the development of performance frameworks asks: ‘are the outcomes...sufficiently defined and characterised, so that progress against them can be measured effectively?’

An outcome statement should therefore define what will change as a result of an intervention and by how much (or, at the very least, in what direction the change will occur). This then allows the means of measurement to be defined.

Sources for Appendix 1

New Zealand State Services Commission 2008. Performance Measurement: Advice and examples on how to develop effective frameworks (August 2008). ISBN 978-0-478-30345-2.

Roughly A 2009. Developing and using program logic in natural resource management: user guide. Canberra, Australian Government Land and Coasts.

Appendix 2 – National outcomes of pest management

Whole of New Zealand outcomes that biosecurity contributes to along with other inputs	Economic strength		Healthy environment	Healthy New Zealanders		Cultural identity		
	Trade and market access for our products are increased.	Economic opportunities, growth and prosperity are maintained and enhanced.	Our natural and historical heritage, the integrity of ecosystems, and the character of New Zealand landscapes are protected and enhanced.	Human health and well-being are optimised.	Our people have healthy and rewarding lifestyles, freedom and respect for cultural expression, and enjoyment of the recreational value of the natural environment.	Māori biologically based economic and cultural resources are protected – the relationship of Māori and their culture and traditions with their ancestral lands, waters, sites, wāhi tapu, and taonga is maintained and enhanced.		
Overall pest management outcomes	A. Pest management – unwanted damage caused by harmful organisms that have established in New Zealand is prevented or reduced					B. Public participation – New Zealanders are active, informed and supportive participants in the biosecurity system		
Pest management intermediate outcomes	Preventing establishment – potentially harmful organisms present in New Zealand have not become pests.	Reducing spread on pathways – the spread of harmful organisms is reduced on domestic pathways.	Eradicating or rolling back – harmful organisms are eliminated or their distribution is reduced over time.	Controlling the harmful organism – the harmful organism is controlled at a level where impacts are manageable.	Protecting values in places – the damage caused by harmful organisms in places is reduced or prevented.	Awareness – understanding by all New Zealanders of biosecurity risks and management activities is improved.	Participation – participation by all New Zealanders in pest-management activities is increased.	Support – support for pest-management programmes and tools increases.