Focusing a lens on the New Zealand animal health surveillance system

The Ministry for Primary Industries (MPI) has the legislative mandate to provide biosecurity for the entire animal population in New Zealand under the Biosecurity Act 1993. The biosecurity system has three main components: pre-border, border and post-border, and the animal health surveillance system is an essential part of post-border biosecurity. Its principal objectives are:

- to provide early detection of exotic or emerging pests and diseases in both domestic and wild animals;
- to provide assurance of country freedom from specified pests or diseases;
- to support market access requirements of countries importing New Zealand products;
- to describe distribution and occurrence of endemic pests and diseases, for use in developing import health standards and to support the setting of priorities for endemic disease control; and
- to support the fulfilment of New Zealand's international reporting obligations, for example to the OIE (World Organisation for Animal Health) (Tana 2014).

The Animal Health Surveillance System conducts both passive and active surveillance. Surveillance is carried out by dedicated systems and programmes including the exotic pest and disease notification system and regional veterinary diagnostic laboratory data analysis. There are also programmes targeted at specific diseases: apiculture, arbovirus, avian influenza, transmissible spongiform encephalopathies and wildlife diseases.

The OIE Terrestrial Animal Health Code, Chapter 1.4 (OIE, 2019) recommends continuing to provide quality assurance of surveillance systems by periodic auditing. Accordingly, MPI has commissioned a surveillance evaluation framework known as SurF (Muellner et al. 2018). We used this framework, with slight modification, to evaluate the components of the surveillance system. SurF has four components: motivation for the evaluation; scope of the evaluation; evaluation design and implementation; and reporting and communication of evaluation outputs. The evaluation was conducted from 2017 to 2019, and each component is described in further detail below.

Motivation for the evaluation

This component of SurF describes the reasons for conducting an evaluation. Our evaluation was motivated by the desire to:

- assess whether present animal health surveillance objectives have remained relevant, with particular reference to changing stakeholder expectations, organism evolution, modern technology and advancements in laboratory techniques;
- standardise and regularise the evaluation of surveillance activities conducted within MPI;
- assess stakeholder engagement and satisfaction with current surveillance;
- assess the pest and disease notification system with a view to enhancing notifications in a structured manner;
- identify key performance indicators to periodically assess the performance of the notification system; and
- collate all previous work related to assessing the notification system,

Functional Group	Attribute
Organisational and management	Programme description Organisation and management Performance indicators and reviews
Processes	Data and information collection Data management and storage Field and laboratory services Resource availability Technical competency and training
Technical implementation	Coverage Data completeness and correctness Timeliness
Output	Historical data Positive predictive value Representativeness and bias Sensitivity Specificity

Table 1: Functional groups and attributes included in the evaluation process

Sector	Representation: Stakeholders external to MPI
Apiculture	Apiculture New Zealand New Zealand Beekeeping Inc. South North Island Beekeeping Inc.
Academia and research	Massey University AgResearch
Equine	Equine Health Association Epi-interactive Ltd New Zealand Veterinary Association
Commercial laboratories	Gribbles Veterinary Laboratories IDEXX Laboratories SVS Laboratories
Porcine	New Zealand Pork Pig veterinary practitioners
Poultry	Poultry Industry Association of New Zealand Poultry veterinary practitioners
Ruminants	Beef & Lamb New Zealand Dairy Goat Co-operative Dairy New Zealand Deer Industry New Zealand Landcorp Farming Ltd Livestock Improvement Corporation Meat Industry Association New Zealand Veterinary Association OSPRI
Wildlife	Wildlife Rehabilitators Network of New Zealand Fish & Game New Zealand New Zealand Centre for Conservation Medicine South Island Wildlife Hospital Wildlife Hospital, Dunedin Wildbase, Massey University Department of Conservation NZVA Wildlife branch Wildlife experts OIE Wildlife Focal Point
	Stakeholders internal to MPI
Trade	Market access Animal Imports and Exports
Preparedness	Readiness and Response Risk Analysis
Laboratories	Animal Health Laboratory Plant Health and Environment Laboratory
International	International Standards OIE Animal Disease Notification Focal Point

Table 2: Stakeholders consulted during the animal health surveillance evaluation process

to identify and address gaps in our understanding of its performance.

These aims may be summarised in the evaluation question: is the current animal health surveillance system fit for purpose?

Scope of the evaluation

The objective was to evaluate all aspects of surveillance except financial aspects such as cost-effectiveness and cost-efficiency (**Table 1**).

Evaluation of the notification system focused on stakeholder engagement, particularly assessing the timeliness of notifications. The other components of the system, such as the 0800 exotic pest and disease hotline, a legal framework for notification, the network of trained veterinary incursion investigators, and diagnostic laboratory capability (Tana 2014) were only included where it was known that they might affect stakeholder engagement. The evaluations had three objectives: to ascertain whether the animal health surveillance programmes achieved their objectives; to identify the strengths and weaknesses of those programmes; and to recommend improvements where necessary.

Evaluation design and implementation

The evaluations were based on 23 SurF-defined surveillance attributes in five functional groups (**Table 1**). Subsets of 12 and 19 attributes respectively were used to evaluate the notification system and the other surveillance programmes. Scores for each attribute were based on a simple "traffic light" assessment: green (no changes needed); amber (fewer than two-thirds of the attribute's elements needed change); and red (two-thirds or more elements needed change). The scores were summarised in a diagram like the example shown in **Figure 1**.

Attributes were selected for inclusion in the evaluation because they were either relevant to the review question or were classified as core requirements of SurF and recommended for inclusion in any evaluation. Assessment of items under the "organisation and management" heading in **Table 1** provided insights into the non-technical aspects of surveillance programmes, for example how surveillance is overseen and its performance monitored, and the mechanisms in place to ensure programmes are up to date.

Assessments under the functional group "processes" aimed at determining how well each surveillance programme was planned, including the type of information to be collected and how it was collected, managed and used. The assessment also aimed to determine whether data-quality controls were in place. We measured how well surveillance activities were carried out in relation to the stated objectives by examining attributes under the functional group "technical implementation".

Reliability of archived information to demonstrate the robustness of surveillance was determined by assessing attributes in the "output" functional group. This included examining the quality of the information, its representativeness, and the ability to detect a specified organism if it were present (or to correctly demonstrate its absence). The benefits of surveillance programmes were assessed under the category of "impact", and here the assessment also provided an indication of how effective the communication strategies for the programmes were.

The evaluation was conducted in two phases. The first phase included

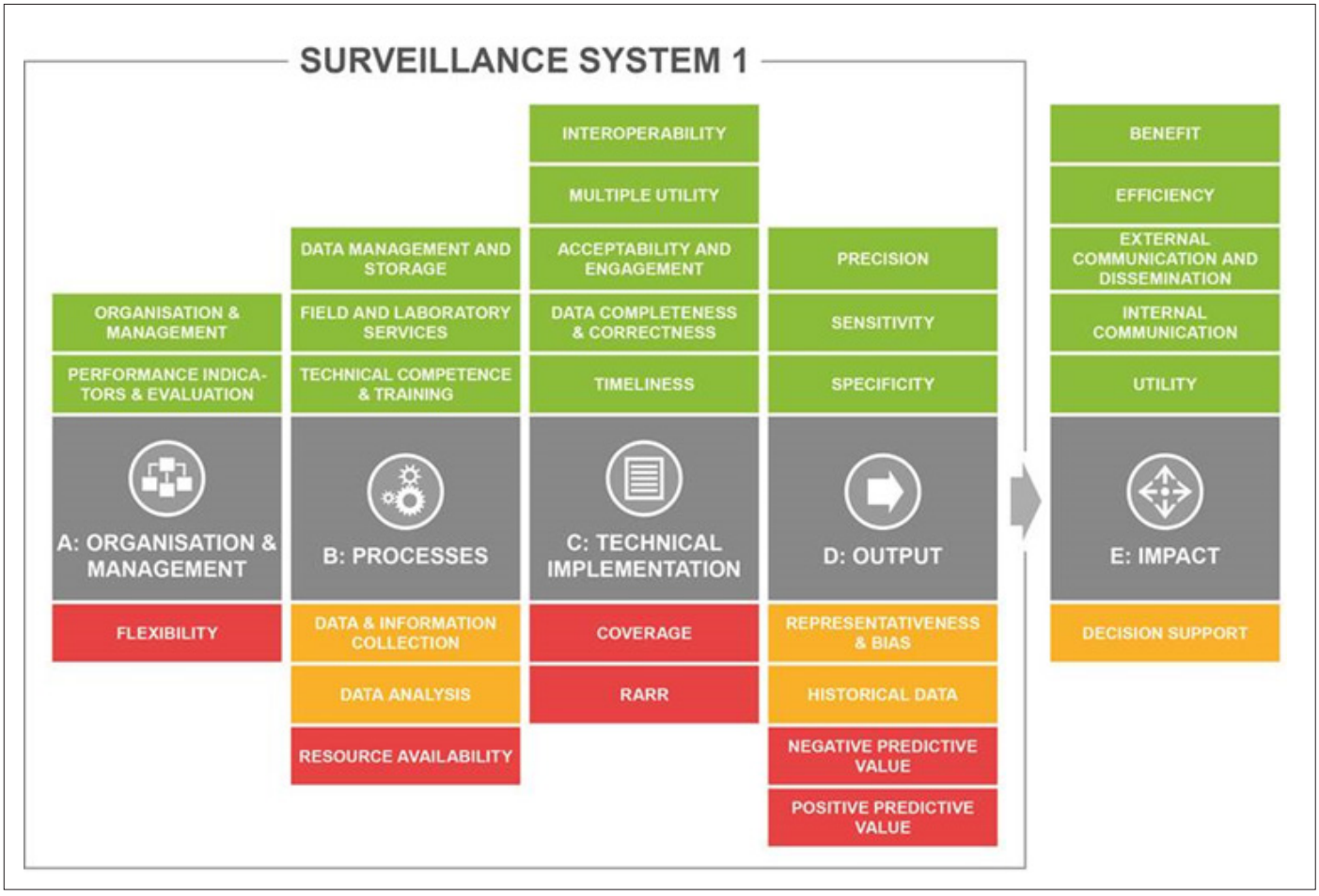

Figure 1: Example of "traffic light" summary used for surveillance attribute assessment using SurF

evaluation of all functional groups except "impact", which was the focus of the second phase. The latter involved consulting both external and internal stakeholders (**Table 2**). More than a hundred stakeholders were engaged, with the aim of determining the level of awareness of existing surveillance, how relevant it was to them and whether it met their expectations. Engagement was by sector rather than by surveillance programme. This was to avoid multiple engagements with some stakeholders that are involved in more than one programme.

Reporting and communicating results

The evaluation report, including stakeholder consultations and feedback, is now undergoing assessment and peer review within MPI's Biosecurity Surveillance and Incursion Investigation (BSII) Animal Health Team. Areas for improvement will be identified, prioritised and appropriate action determined. Findings of the review will be published in due course in *Surveillance*.

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