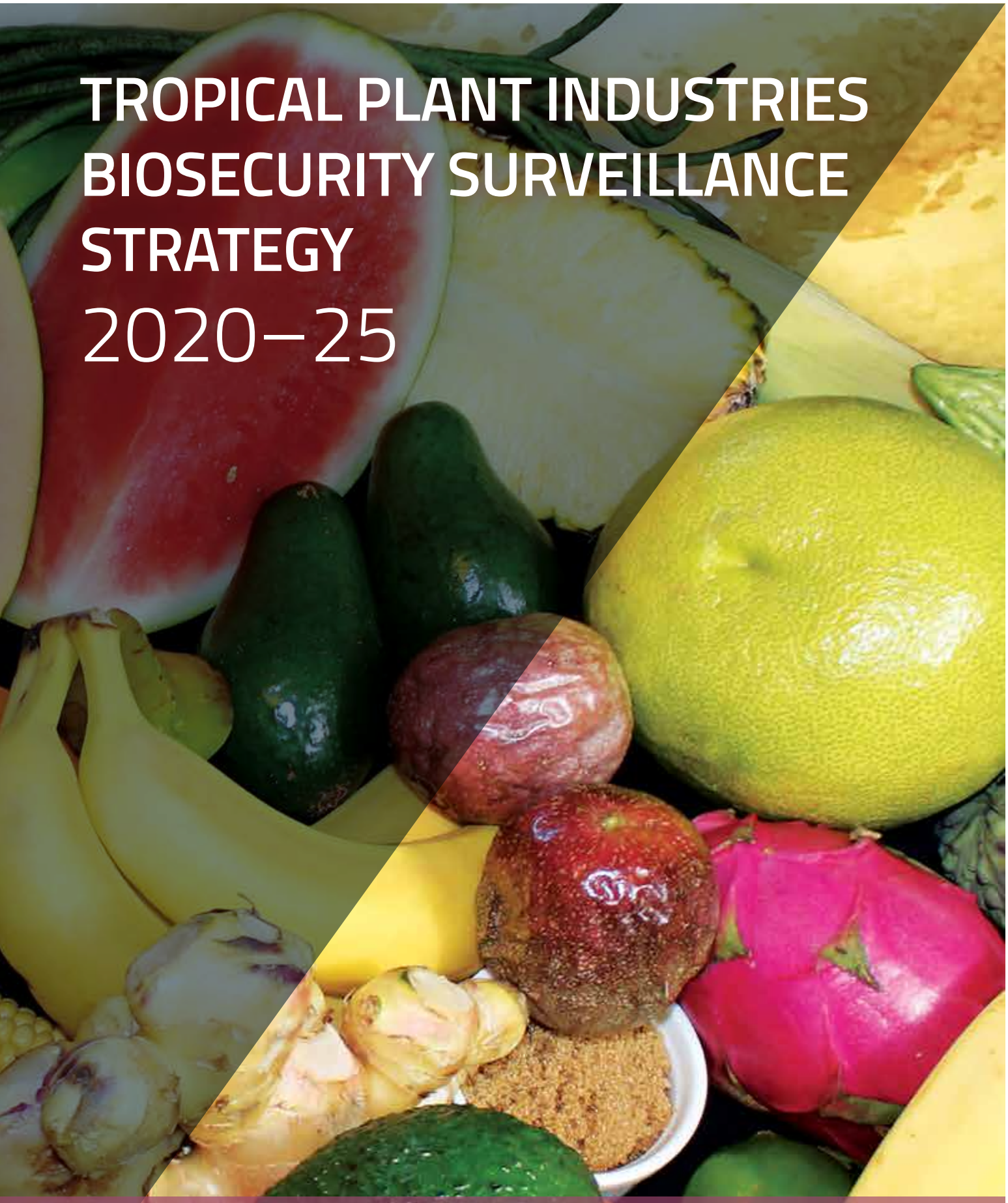
TROPICAL PLANT INDUSTRIES BIOSECURITY SURVEILLANCE STRATEGY 2020–25



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About this publication

The TPIBSS has been developed through a consultative process with industry and government. Information on government and industry surveillance, industry statistics and background information were compiled to inform the development of the strategy. The strategy, implementation plan and background information has been prepared in two parts:

- The Strategy document, (this document) which provides an overview and includes the vision, outcomes, goals and actions. It also details the activities and tasks required to deliver the strategy's outcomes and provides a timeframe for each task.
- The Background document (available online at **www.planthealthaustralia.com.au/strategies**) which provides background information, industry statistics and surveillance activities (referred to as TPIBSS Background).

Part A: The strategy

Vision for the future

Surveillance is a cornerstone of effective biosecurity and is essential to managing plant pest threats in Australia. This strategy (along with other strategies and programs) will contribute to the development of a plant pest surveillance system in northern Australia that supports collaboration between industries, governments and the community.

Our vision: A collaborative surveillance system for northern Australia that engenders confidence and trust across the tropical plant industries through improved data collection, early detection of pests, enhanced market access, and a more robust and resilient national plant biosecurity system in Australia.

Outcomes

This strategy seeks to provide benefits through the following outcomes:

- greater confidence in pest status through increased risk-based surveillance planning and collection of data on pest presence and absence
- a more informed biosecurity community with greater understanding and commitment to surveillance
- improved information on pest status to support market access and maintenance
- plant industries that are more resilient and prepared for future pest threats
- improved collaboration and trust between partners that supports shared biosecurity goals.

These outcomes will be achieved through delivery against five goals, each with associated actions and tasks. The strategy will be supported by an implementation plan that will provide further detail and projected timelines to achieve outcomes.

The strategy proposes a range of measures to identify gaps in, and priorities for, plant pest surveillance to deliver improved surveillance outcomes for tropical plant industries in northern Australia. These measures include stakeholder forums and improved planning where parties work together to achieve the strategy's goals. Initially implementation of the strategy will capitalise on existing collaborative arrangements to ensure transparency and facilitate trusted sharing of information.

To create efficiencies, build resilience and trust, and address market failures in biosecurity systems, some changes will be required in the way governments and industries currently operate. Implementation of this strategy will ensure our biosecurity system is fit-for-purpose into the future and continues to protect Australian agriculture and our unique environment.

Overview

Northern Australia has a significant diversity in environments and climates ranging from the wet tropical areas of far north Queensland to the open woodlands and semi-arid grasslands of the Northern Territory (NT) and Western Australia (WA).

High plant diversity coupled with sparse population, extensive coastline, isolated growing regions and proximity to neighbouring countries with high exotic pest populations means northern Australia faces unique biosecurity challenges.

The size of the tropical plant industries in the north varies greatly and differences in their geographic distribution, production, markets and exposure to key pest threats means that all industries have varying biosecurity focus, capability and capacity.

A range of agricultural and horticultural crops – including sugarcane, bananas, mangoes, melons, citrus and avocados – are grown over a large geographic area.

Due to the sparseness of population and extensive areas to cover in northern Australia, resources in government and industry are often limited. Many tropical plant industries are not of sufficient scale to generate the resources required to maintain and enhance their plant biosecurity status, resulting in market failures. In addition, to maintain the biosecurity status of tropical plant industries, governments and industry face many competing priorities.

The biosecurity system in Australia is comprehensive and has kept Australia free of many significant plant pests affecting other parts of the world. The system requires constant improvements however, due to the increasing focus on plant production across northern Australia and the vulnerability of plant industries to a range of exotic pests, coupled with limited resources to manage biosecurity. As a result, collaborative effort between parties is needed to enhance surveillance capacity and capability for early detection of exotic pest incursions and to monitor established and endemic pest populations.

The Tropical Plant Industries Biosecurity Surveillance Strategy (TPIBSS) will provide northern plant industries and governments with the overarching direction and a framework to understand, address and resolve impediments to improved surveillance, embedding more structured and collaborative surveillance practices into the plant industries across northern Australia.

The strategy is based on the following principles:

- surveillance undertaken with a collaborative approach to data sharing and analysis
- surveillance undertaken to agreed national standards
- data sharing in accordance to pre-agreed parameters
- confidentiality of data maintained within pre-agreed guidelines between all parties.

The strategy proposes goals and actions (page 8–9) which aim to establish a Tropical Plant Industries Surveillance Program which will provide a greater level of confidence in surveillance across the northern plant industries targeting the unique biosecurity context of the tropical north. These goals and actions will also enhance the collaboration, coordination, efficiency and effectiveness of surveillance efforts across tropical plant industries.

Scope

This strategy provides a framework that ensures the pest risks which threaten plant industries in northern Australia are reduced through collaborative surveillance efforts of peak industry bodies, growers, governments, and key groups within the broader community. Specific actions are outlined, to support decision making that is inclusive of industry and government stakeholders in northern Australia. Delivery of the strategy is guided by the associated implementation plan.

This strategy focuses on those plant industries that have significant production in northern Australia or that are significantly threatened by pest risk pathways unique to northern Australia. Some of these industries also have production in other areas within Australia, although several (e.g. durian, cocoa) are produced only in northern Australia due to climatic requirements.

Whilst there is limited production of cotton, grains crops, or commercial rice in northern Australia, specific northern pest pathway threats to these industries warrant consideration of biosecurity surveillance by those industries.

Many other plant crops are grown in northern Australia, however they represent only a small proportion of national production and are therefore not considered in this strategy.

Forest industries also occur in northern Australia, however their associated biosecurity surveillance is covered under the National Forest Biosecurity Surveillance Program.

In its implementation, the strategy considers the collaborative and productive relationships that exist between the relevant plant industries, the WA, NT and Queensland governments, and the Australian Government.

Summary of goals and actions

Goal 1

IMPROVE PLANNING, PRIORITISATION, PREPAREDNESS AND COORDINATION FOR SURVEILLANCE

Action 1.1 Increase the robustness of surveillance planning and decision making through analysis of existing surveillance data and prioritisation of pests and pathways

Action 1.2 Implement mechanisms to coordinate surveillance and agree on shared priorities and goals

Action 1.3 Address barriers to surveillance and reporting to support the early detection of key pest threats

Goal 2

INCREASE EFFECTIVE ENGAGEMENT, AWARENESS AND COMMUNICATION WITHIN AND BETWEEN STAKEHOLDERS

Action 2.1 Develop and implement a communication and engagement plan which will increase knowledge, awareness and engagement to improve surveillance effort and outcomes

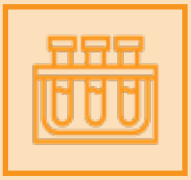
Goal 3

IMPROVE SURVEILLANCE DELIVERY

Action 3.1 Build capacity and capability for surveillance

Action 3.2 Improve surveillance outcomes in urban and peri-urban environments through the development of partnerships with the industry supply chain and community

Action 3.3 Adopt tools, standards, technology and systems to improve surveillance



Goal 4

ENSURE AVAILABILITY OF FUTURE DIAGNOSTICS SERVICES

Action 4.1	Build capacity and capability to improve the delivery of diagnostics to support surveillance outcomes
Action 4.2	Adopt tools, technology and protocols for diagnostics

Goal 5

IMPROVE SURVEILLANCE DATA CAPTURE, QUALITY AND ACCESS FOR STAKEHOLDERS

Action 5.1	Increase and encourage data sharing to support surveillance
Action 5.2	Improve surveillance data quality
Action 5.3	Ensure effective data capture across the tropical plant industries biosecurity system

Background

Plant industries in northern Australia

Northern Australia has diverse climatic and environmental characteristics (Figure 1). Much of northern Australia (north of the Tropic of Capricorn) is considered to be tropical, and while there is significant climatic variation between regions, rainfall is summer dominant and occurs as a 'wet' season. The tropical north ranges from the wet tropical areas of far north Queensland to the open woodlands and semi-arid grasslands of the NT and WA.

This diversity provides conditions that allows a wide range of commercial crops to be produced. Collectively, the annual farm gate production value of these crops is over $3 billion dollars with sugarcane dominating both in value ($1.75 billion) and land under production (380,000 hectares, 80 per cent of which is in northern Australia). The other larger plant industries in northern Australia are bananas and mangoes, with a combined value of $700 million annually[1].

Banana, mango, melon, citrus and avocado crops are the principal fruits produced although there are numerous other commercial plant industries, including custard apples, lychees, papaya, passionfruit, pineapples, production nurseries and vegetables.

Many of these industries also have production areas in other parts of Australia. A diverse array of exotic tropical fruits is also grown commercially and are dealt with as a collective in this strategy.

These plant industries face a range of exotic and domestic pest threats which could significantly impact production systems through a combination of yield loss, quality reduction and increased need for chemical application to manage pests, or changes in the complexity of management systems. As several of the tropical industries are also interested in expanding their export markets, biosecurity practices and pest surveillance will assist to gain access to new markets.

Northern Australia faces unique biosecurity challenges due to high plant diversity coupled with a sparse population, an extensive coastline and isolated growing regions. Additionally, northern Australia's proximity to countries which already have populations of exotic pests heightens the biosecurity risks and the importance of surveillance.

The size of these industries varies greatly, and differences in their geographic distribution, production, markets and exposure to key pest threats means that all industries have varying biosecurity focus, capability and capacity. The largest industries have extensive capability or potential capability, whilst smaller exotic fruit industries have no specific representative bodies and minimal capacity for surveillance. Between these extremes there exists a full spectrum of capability and biosecurity activity.

Figure 1. For the purposes of this strategy, northern Australia is defined as the area of Australia north of the Tropic of Capricorn in Western Australia and Queensland, and all of the Northern Territory.
Image: Australian Government Department of Infrastructure and Regional Development

Industry representation

In Australia, growers may be represented by peak industry bodies (PIBs). The roles of these PIBs includes liaison with the Australian Government, state and territory governments and authorities on relevant industry issues, including biosecurity, research and development (R&D), market access and food safety. PIBs also provide strategic direction, leadership and advocacy for their industry and have a key role in communicating information to growers. Most PIBs have supported the introduction of production-based levies, collected by the Australian Government. The levies are collected to fund a range of activities, including R&D, marketing and biosecurity.

Plant industries in this strategy are represented by eighteen PIBs, further details of which are in TPIBSS Background document[2].

Major production areas

Production in northern Australia is highly concentrated into several regions. The majority of production in northern WA is centred at Kununurra, where the Ord River Irrigation Area provides for a diverse mix of small and large-scale enterprises. There are also small pockets of irrigated horticulture near the towns of Broome and Derby.

In the NT, most production occurs in the area surrounding Darwin and separately around Katherine and Mataranka, 300–400km south of Darwin, with some horticultural production in the Alice Springs–Ti Tree region.

North Queensland crop production is located predominantly on the coastal strip and adjacent hinterland from Cooktown and Lakeland in the north through to Yeppoon in the south, with an additional major production area on the Atherton Tablelands. Also, emerging production of cotton and grains in regions through north Queensland and the Katherine and Kununurra regions is occurring.

Further information on the tropical plant industries and aspects of their current biosecurity focus are provided in TPIBSS Background document[3].

Threats and pathways

All plant industries are threatened by pests which are not currently present in Australia. The potential impacts of some of these pest threats can be managed within existing crop production systems however, some will require new production systems or treatments and/or result in significant market disruptions that could render industries no longer viable. The risk these exotic threats represent to plant industries are the justification for stringent biosecurity actions applied at Australia's international border.

The productivity and export capability of plant industries are also threatened by pests already present in Australia. These pests are a combination of endemic pests native to Australia, and previously exotic pests that have since established and spread within Australia. For most industries, these pests are as important as potential exotic pests as they have an immediate business impact for growers. Strategies to mitigate established pests, including surveillance and crop monitoring, are therefore a high priority for plant industries and can encourage and form the basis of surveillance for exotic pests.

An understanding of the pathways by which pests arrive and spread throughout the country is critical to effectively mitigating them. When designing effective surveillance, pathway knowledge informs the likelihood of entry, establishment and spread of the pest and determines the most effective places to look for it. It allows prioritisation of surveillance efforts, maximising surveillance sensitivity and potential early detection.

Broadly, pathways can be separated into regulated and unregulated pathways. Unregulated pathways include pathways influenced by irregular behaviours, incidental association (hitchhiker pests) and natural factors such as wind.

The dynamics of pest pathways into northern Australia from overseas are well understood, however the knowledge about the way threats spread within the country is mostly restricted to those pathways that are specifically regulated between regions.

Despite Australia's comprehensive biosecurity system, the history of pest incursions demonstrates that regulation of international pathways can slow the rate of arrival but cannot mitigate all threats. Analysis of incursion history for the larger plant industries in northern Australia also indicates that in some cases threats have arrived in southern regions of the country and then moved north.

1. *Australian Horticulture Statistics Handbook 2019–20 (2020). Horticulture Innovation Australia*
2. *TPIBSS Background document. Accessed online at* **www.planthealthaustralia.com.au/strategies**
3. *TPIBSS Background document. Accessed online at* **www.planthealthaustralia.com.au/strategies**

As there are increasing volumes of people, freight, cargo and mail that move through urban and peri-urban communities, the importance of understanding these internal pathways is increasing. Urban pathways are defined as routes in areas which are primarily residential. Peri-urban areas fringe residential and production areas where land-use includes a mixture of commercial production of plants or livestock.

Pathways into urban and peri-urban areas are often associated with non-commercial activities and are inherently difficult to regulate and manage. Mitigation of threats from these pathways is often more effective through communication, awareness and community focused strategies. Peri-urban areas are particularly critical points of intersection between urban pathways into production areas. So too are production nursery supply chains, with some supply chains servicing both residential and landscaping demand as well as planting material needs of industries.

In addition to regulated international pathways, plant industries in northern Australia are particularly vulnerable to unique natural pathways. The islands of Torres Strait can act as stepping-stones for pests moving from Papua New Guinea to Queensland, through traditional trade between Papua New Guinea and the outer Torres Strait islands in accordance with Australia's treaty obligations.

Cyclonic weather and seasonal monsoon winds can also actively move pests from Indonesia, Timor-Leste, and Papua New Guinea into northern Australia. Despite active regulation of pathways into northern Australia, there is also the possibility of illegal importation of plants and plant products.

Case study – Sugar cane smut detection in Australia

The importance of including surveillance as a preparedness activity for a high priority pest was well demonstrated when sugar cane smut arrived in the Ord River Irrigation Area in 1998.

The Australian sugar industry had initiated a surveillance program to support early detection of this exotic disease. The subsequent detection of sugar cane smut in Kununurra triggered increased investment in plant breeding to develop resistant sugar cane varieties.

The plant breeding program developed resistant varieties that were able to be rapidly deployed in sugar cane smut affected production areas, following the first detection in Queensland in 2006.

This relationship between surveillance, plant breeding and response protected the industry against losses worth many millions of dollars.

The role of surveillance in managing biosecurity threats

Risks associated with exotic biosecurity threats can be mitigated in different ways. The most effective strategies are those which prevent the entry of the threat. However, this is not always possible and strategies involving enhanced surveillance, effective preparedness activities and improved pest management are favoured to reduce the pest impacts. Biosecurity responses may require the implementation of a range of complementary activities that focus on assessing and limiting the impact of new biosecurity threats. Eradication or containment may be part of the response, if technically feasible.

Surveillance can play an important role in both preparedness and response for the following reasons:

- **Early detection of pest incursions** – early detection is important as the smaller the area of pest establishment, the higher the likelihood of successful eradication, reducing the cost or overall impact of an incursion.
- **Delimiting the distribution of a pest** – determining the extent of establishment or spread of a pest provides vital information to support the feasibility and cost of pest eradication or containment. Understanding a pest's distribution is also important for ensuring that market access treatments or restrictions are appropriate.
- **Supporting market access** – Ongoing evidence that a pest is absent is needed as export and interstate markets want assurance that pests will not be introduced with traded commodities.

The role of surveillance is discrete, and if not aligned with tangible benefit to an industry or a broader surveillance strategy it is likely to waste resources. If designed and delivered effectively, surveillance increases the likelihood that a pest is detected (if present) or confirm the absence of a pest. A summary of current surveillance activities across industries and governments is described in TPIBSS Background document[4].

Types of surveillance

Surveillance is made up of a range of activities including crop monitoring and sampling, data collection and analysis, risk and pathway assessment, and communication and engagement. These activities can be undertaken by a wide range of stakeholders in industries, governments and the community.

The aim of biosecurity surveillance is to look for pests that are not yet present in the country or in a particular region, state or territory. Given the large potential areas to be covered in Australia, and the number of pathways that can introduce new pests, the task of surveillance is larger than any one agency or group can deal with.

Surveillance can be defined as:

- **Specific surveillance** – a surveillance activity conducted over a defined period that records the detection of, or confirms the absence of, specific pests. Such activities demonstrate which pests are present or absent in a region and are typically highly structured, with records captured on pest and host targets, activity date, location, pest levels (including pest absence).
- **General surveillance** – a process whereby information on particular pests which are of concern for an area is gathered from many sources, wherever it is available, and provided for use by the National Plant Protection Organisation (NPPO). General surveillance activities can vary significantly in their structure and the detail of information collected.
- **Delimiting surveillance** – a surveillance activity conducted to establish the boundaries of an area considered to be infested by or free from a pest.
- **Crop monitoring** – surveillance at the property level is termed 'crop monitoring' and is usually driven by the need to make decisions about crop management. Crop monitoring can either be specific (if activities are structured around target pests and appropriate records are gathered), or general (if activities are undertaken to broadly monitor pest levels to make management decisions).

4. *TPIBSS Background document. Accessed online at* **www.planthealthaustralia.com.au/strategies**

Drivers to improve surveillance

Increasing threats

As biosecurity risks and pathways change, surveillance effort also needs to change to match those threats. Rates of global pest spread are increasing as new markets evolve and world trade volumes increase. Regulated import and passenger pathway volumes are expanding and are expected to double within the next decade[5,6]. Trade in fresh plant material, along with natural pest dispersal, is facilitating pest movement around the world at rapidly increasing rates.

Emerging pest threats

Examples of pests that have emerged as rapidly spreading threats for plant production around the world include fall armyworm (*Spodoptera frugiperda*) and tomato leaf miner (*Tuta absoluta*). During the nine years that followed the detection of tomato leaf miner in Spain it spread through Europe and Africa. More dramatically, fall armyworm, which is native to the Americas, was detected in Africa in 2016 and has since spread rapidly. Fall armyworm has been detected in countries including India, China and Indonesia and was first detected in Australia in early 2020.

Our neighbouring countries also have active trade pathways carrying plant biosecurity risks and their infrastructure and systems to manage these risks are comparatively limited. As a result, these countries provide a place for exotic pests to establish before migrating into Australia. As the global spread of pests increases, we are likely to experience increasing levels of risk approaching through natural pathways.

High Priority Pests can not only move within and threaten Australian plant industries, but also the natural, urban and peri-urban environments. In many regions of northern Australia, there is little or no geographic separation of commercial agriculture from the peri-urban and natural environments, highlighting the need to identify high-risk pathways, and include both commercial production and these other environments in surveillance efforts.

Threats across industries

A significant proportion of pests affect more than one host plant species and can impact multiple industries. Many also affect groups of related plants and these may be agricultural, ornamental or native to Australia. As a result, effective surveillance design needs to address many factors and effective delivery requires significant coordination across differing production, urban and natural environments. Surveillance to determine presence or absence is usually conducted over a wide area where multiple industries and hosts exist.

Surveillance to support exports usually focuses on proving pest absence and is often undertaken at the property level. National and regional capture and coordination of these data to contribute to area wide determination of absence will require collaboration, particularly through sharing of absence data. This will strengthen confidence in surveillance and require less overall effort.

Limited resources and coordination

Many plant industries operating in northern Australia are relatively small and lack the resources or mechanisms to generate resources in the short-term to expand surveillance efforts. Similarly, the three northern government jurisdictions focus on emergency responses and proof-of-freedom but have limited resources to expand their current surveillance activities. Australian Government surveillance investments are limited to those risks associated with natural pathways and the highest priority threats assessed at a national level.

While a considerable level of surveillance is currently occurring across all stakeholders,[7] it is being undertaken with limited coordination. A collaborative approach to surveillance and increased sharing of information will ensure that effort is best directed to those threats posing the greatest risk.

5. *Australian Bureau of Statistics, International Trade. Accessed online 2 February 2020* **www.abs.gov.au/statistics/economy/international-trade**

6. *Australian Bureau of Statistics, Tourism and Transport. Accessed online 2 February 2020* **www.abs.gov.au/statistics/industry/tourism-and-transport**

7. *TPIBSS Background document. Accessed online at* **www.planthealthaustralia.com.au/strategies**

Biosecurity gaps in northern Australia

Surveillance activity delivered through the governments of WA, NT, Queensland and the Australian Government focuses on responding to significant detections, early detection of a small number of high profile exotic pests, and early detection of threats associated with natural pathways (primarily wind and Torres Strait movements). These activities are not a structured approach to early detection for those threats arriving through regulated or unregulated pathways or spreading from other areas within Australia.

Surveillance activity levels vary across plant industries and, despite significant levels of crop monitoring in some areas, little information on pest status goes beyond the property level. There are multiple cultural and commercial reasons for this, and most are justifiable, however this results in a low likelihood of reporting early detection of a pest in these areas. Separately, much of the regulated pathway risk is manifesting in urban or peri-urban environments where surveillance delivery is challenging. In the absence of structured surveillance effort in urban and peri-urban areas, early detection will only occur through investments in general surveillance strategies.

Recent pathways research in northern Australia identified that many threats which enter Australia in one area can take considerable time to spread to other areas. This is particularly the case for isolated production areas such as Kununurra or Katherine. Records of the spread of particular pests occur, but this information is not well stored, managed or shared, affecting our ability to improve early warning across regions for the spread of new pests.

Operating through a collaborative and strategically proactive approach will enhance surveillance capability in the production, urban and peri-urban environments, improving our collective opportunity to achieve early detection.

Case study: Business benefits of structured surveillance within citrus and mango production*

Demonstrating the value of structured surveillance for high priority exotic pests will be needed to provide an incentive for implementation by growers.

To investigate the business benefits of surveillance, two case studies were undertaken that assessed scenarios of farm-based structured surveillance programs implemented prior to the detection of a new pest in a region. In these scenarios, the role of surveillance was considered in providing supporting evidence that would assist a business return to trade, compared with businesses with no structured surveillance program in place.

These scenarios were based on having arrangements in place which accepted that surveillance data collected on-farm would support demonstration of pest freedom, and that surveillance was accompanied by sound on-farm biosecurity practices.

Red banded mango caterpillar

Implications for growers were assessed following a hypothetical detection of red banded mango caterpillar in the Mareeba–Dimbulah region of north Queensland. For an individual grower, the benefit–cost ratio of implementing a structured surveillance program was compared to the absence of a structured surveillance program.

Benefits ranged from $6 return for every $1 spent on surveillance assuming the incursion occurred in year 20 following implementation of the program, increasing to $23 for every $1 spent if the incursion occurred as early as year five of the program.

Citrus canker

The benefits of on-farm surveillance to demonstrate orchard or area freedom were assessed using a case study of the detection of citrus canker, again in the Mareeba–Dimbulah region of north Queensland.

As with the red banded mango caterpillar case study, the benefit–cost ratio of implementing a structured surveillance program compared with the absence of a structured surveillance program was incremental, depending on the time of detection in the program. Similar results were obtained, with $6 return for every $1 spent if an incursion occurred in year 20, increasing to $27 for every $1 spent if the incursion occurred in year five of the program.

Both scenarios demonstrated a clear benefit for growers in implementing structured surveillance for key pests that would, if present, impact on trade and market access.

**Note: these case studies were developed in 2019, using price data available at that time*

Barriers to surveillance and reporting

Trust in emergency response arrangements

Governments have particular responsibilities in the biosecurity system however industries also have an important role to play. Many plant industries in northern Australia are signatories to the Emergency Plant Pest Response Deed (EPPRD) through their PIBs. The EPPRD has a focus on eradication response arrangements and provides mechanisms for shared decision making and cost-sharing between industries and governments. Signatories to the EPPRD also have a commitment to an on-going process of risk mitigation and promotion of improvements to biosecurity measures. While the EPPRD provides a sound framework for shared decision making between industry and government signatories, awareness regarding biosecurity issues, threats, and processes associated with the EPPRD vary greatly across growers and industry organisations. Industries with history of significant exotic incursions and responses have relatively more awareness and are usually investing in biosecurity risk management.

Whilst emergency response systems and cost-sharing mechanisms embodied within the EPPRD are envied internationally, there are limitations that could be improved.

For growers and regional communities, uncertainty over response decisions and potential market closures are driving resistance to new pest reporting and creating barriers to improvements in surveillance systems for early detection.

For the greatest opportunity to eradicate or manage an exotic pest it is imperative that a grower should report anything suspicious. If a grower does not, then the potential implications can be serious, not only for their business but for the entire industry.

Market failure

Surveillance supports many national priorities, from maintaining or sustaining trade, to early detection to limit pest impact on production, and plant and environmental health. While some of these priorities are of direct benefit to individuals in crop production, others have far wider benefits to regional and urban communities. Identifying all beneficiaries and then negotiating equitable contributions is difficult. Without an agreed and coordinated approach to addressing national surveillance priorities for tropical plant industries, there will be situations where market failure occurs.

Market failure is defined as a situation where inefficient distribution of goods and services occurs and where individual incentives do not lead to rational results for broader national outcomes. In the current environment for plant pest surveillance in Australia, market failure is occurring for several reasons, including:

- **Lack of capability and capacity** – small industries do not have the capacity to coordinate surveillance activities, and therefore industry wide surveillance could only occur with government assistance.
- **'Free-riders' in the biosecurity system** – surveillance for early detection of new pests may be undertaken by relatively few growers, but the results benefit many growers, potentially across a large number of industries. There is no mechanism to exclude those who have not contributed to surveillance from benefitting from the outcomes of surveillance.

Through the introduction of production-based levies, many plant industries (e.g. cotton, sugar, nursery, bananas) make significant investment in specific biosecurity staff, biosecurity planning, R&D, and programs to manage biosecurity threats.

Other industries also have production-based levies in place and are capable of achieving some of the necessary biosecurity outcomes, although they lack adequate financial resources, or have competing priorities for limited resources, and rely on technical and resource assistance from government. While biosecurity is challenging for them to address, they have the capacity to steadily improve their capability. Tables 1 and 2 in TPIBSS Background[8] document detail the levy arrangements for each plant industry.

However, other industry organisations have very limited capacity to contribute to biosecurity outcomes for their own industry. This is because they either lack a production-based levy for biosecurity activities, or their production is limited, and they do not raise adequate levy funds to contribute to industry biosecurity priorities. Growers of crops such as exotic fruits (e.g. rambutans, durians) have no organisation specifically representing their industries. These growers as a collective have no current capacity to contribute to industry biosecurity or surveillance priorities, apart from implementing sound practices in their own orchards.

The costs associated with sound biosecurity planning, R&D and biosecurity management activities are beyond the scope of smaller industries and growers and they are reliant on state or territory governments for technical input to biosecurity issues. The governments also have resource limitations. The relatively small value of these industries in the overall economy can result in limited support from government, despite the obvious biosecurity market failure. This issue, and the implications of the inability of smaller industries to manage their biosecurity, needs to be considered in current and future surveillance planning.

8. TPIBSS Background document. Accessed online at **www.planthealthaustralia.com.au/strategies**

Part B: The implementation plan

Goals and actions

Goal 1

IMPROVE PLANNING, PRIORITISATION, PREPAREDNESS AND COORDINATION FOR SURVEILLANCE

Rationale

Currently business owners and staff, consultants, agronomists and crop scouts perform crop monitoring activities for crop protection purposes. Some also deliver surveillance to demonstrate absence of specific pests to support farm businesses that export fresh products. At a regional level, governments and some industry bodies conduct surveillance to demonstrate absence of specific pests to facilitate both domestic and export trade or to detect exotic pests that have recently established. All of these surveillance activities support the viability of the plant industries, directly or indirectly.

Given the number and types of activities currently occurring, improved planning and coordination will ensure that resources and efforts are best directed to areas that provide greater benefits and address gaps. It is essential to prioritise activities by determining the purpose of the surveillance and the pests that warrant surveillance effort. Mechanisms to support planning and prioritisation include the development or improvement of comprehensive biosecurity plans or surveillance plans that identify objectives and guide effort and investments.

Equally important, for surveillance to become embedded in agricultural practice, barriers to surveillance need to be addressed.

Current barriers to the establishment of surveillance and pest reporting programs include a lack of trust in the outcomes of emergency responses to plant pest incursions, the potential financial impacts on businesses upon pest reporting, the social impact on the first reporter and the issues related to the eligibility for Owner Reimbursement Costs for impacted businesses. Addressing these barriers will be achieved through the development of pre-emptive arrangements including the implementation of systems and processes that assist business continuity during a response, improved support for those reporting plant pests, and providing businesses with greater support for the outcomes of potential pest detections.

Actions

1.1 Increase the robustness of surveillance planning and decision making through analysis of existing surveillance data and prioritisation of pests and pathways

1.1.1 Utilise border interception data and international and domestic pathway intelligence in pest threat assessments during the development of biosecurity plans

Most biosecurity plans do not currently include detailed information about potential entry and spread pathways, the pathway prevalence of given threats, or information regarding how effectively those risks are being mitigated. The provision of this information would help delineate which threats warrant surveillance and where it should be conducted. Improvements to biosecurity plans will improve surveillance outcomes (and biosecurity outcomes generally) and provide the ability to collaborate across industries and governments on collective goals.

1.1.2 Develop a decision tool to assist pest surveillance prioritisation for plant industries

A decision tool for use in the biosecurity planning process that considers relevant information, including the pathway parameters mentioned above, could better guide industries and governments regarding surveillance objectives and priorities for each industry.

1.2 Implement mechanisms to coordinate surveillance and agree on shared priorities and goals

1.2.1 Establish coordination and leadership for a collaborative surveillance program comprising government and plant industry representatives

To create efficiencies within and between surveillance activities occurring in industries and governments, efforts must be coordinated, and a surveillance program needs to be established. To ensure this program is delivered, dedicated resources for coordination are needed and an advisory group established to build and maintain collaborative efforts between government and industry.

1.2.2 Facilitate forums where biosecurity issues are considered and addressed through collaborative actions agreed by industries and northern governments

Joint forums that support identification of biosecurity preparedness activities, surveillance targets, timetables and roles and responsibilities will be important in establishing and maintaining collaborative partnerships and ensuring any gaps are prioritised.

1.2.3 Identify and establish mechanisms to coordinate cross-industry surveillance needs

MOU's outlining the intent of the collaborative effort and associated parameters are a sound method of clearly articulating the purpose of collaboration and the responsibilities of each party. These types of formalised arrangements promote transparency between parties and are useful to demonstrate an ongoing shared commitment.

1.2.4 Establish funding mechanisms to support coordination and implementation of risk-based surveillance in northern Australia

To ensure the surveillance program is established and maintained, funding mechanisms must be identified, and a sustainable funding base developed.

1.3 Address barriers to surveillance and reporting to support the early detection of key pest threats

1.3.1 Develop systems that encourage the development of pre-emptive arrangements for management of businesses during a pest incursion and associated response

Pre-emptive arrangements may include the development of systems and processes which focus on the sustainability and continuity of businesses during an incursion and associated response.

1.3.2 Develop processes to gain in-principle agreement to support business continuity in the event of pest incursions

Planning for business continuity in the event of a pest incursion will assist businesses identify biosecurity risks as well as controls to mitigate these risks. Development of business continuity plans would outline the potential implications for trade, identify expected in-field and post-harvest management protocols and provide businesses with a greater understanding of the implications of the detection of a new pest, allowing them to be better prepared.

1.3.3 Support the development of systems and processes to provide financial and social assistance for 'first reporters'

While early detection of a new pest provides the best chance of eradication or implementation of management systems, reporting a suspected exotic pest can have significant impacts on individuals and businesses. These impacts can be financial as well as social, and improved processes that recognise the benefit of early detection and reporting need to be developed and implemented, so 'first reporters' are recognised and supported for their positive contribution to industry or the environment. Reducing barriers to reporting will therefore benefit the biosecurity system, plant industries and regions.

Goal 2

INCREASE EFFECTIVE ENGAGEMENT, AWARENESS AND COMMUNICATION WITHIN AND BETWEEN STAKEHOLDERS

Rationale

Effective engagement will be required to achieve a future biosecurity community that is informed and committed to surveillance.

Communication regarding surveillance activity within and between governments and industries is variable. While departments within governments carry primary responsibility for biosecurity surveillance, much of the structured industry surveillance effort is delivered by research scientists who provide specialist diagnostic, surveillance, and research outcomes under contract research funding. These activities and results are not always visible to the government departments.

Low awareness and visibility of surveillance effort and outcomes is also pronounced within industry. Information about significant detections may not be available or shared, resulting in poor understanding of response arrangements or the need for surveillance. Eradication of a pest is worth communicating, and it is equally important to highlight effective research that helps manage a new threat or other valuable response and preparedness outcomes. A lack of communication about these outcomes results in low understanding of the value or benefit of surveillance and early detection.

Australia and its states and territories have sound emergency response systems and the EPPRD provides mechanisms for shared decision making and cost-sharing between plant industry and government signatories in a response. Within many growing communities however, details about these mechanisms are either not widely understood, or do not resolve the flow-on effects of market closures that can result from pest detections.

Collaborative forums, where partners identify biosecurity issues and surveillance needs, offer potential to share information that addresses the awareness issues described above.

Actions

2.1 Develop and implement a communications plan which will increase knowledge, awareness and engagement to improve surveillance effort and outcomes

2.1.1 Implement regular communication of northern biosecurity surveillance, response and preparedness activities and outcomes within and between governments, peak industry bodies and other regionally based grower organisations

Improving communication of activities will provide clarity on the surveillance effort and identify opportunities and mechanisms to address gaps. Increased communication will also raise understanding of the importance of surveillance and preparedness efforts being undertaken by all parts of the biosecurity system and plant production supply chain. Highlighting these activities will promote a shared approach to biosecurity and development of collaborative partnerships.

2.1.2 Identify and implement mechanisms to communicate information about spread of biosecurity threats

Many detections of pests represent new records for a state or agricultural region. These detections are reported, however their ongoing spread or movement over time is rarely monitored and very rarely communicated across both industry and government. Coordination, capture and dissemination of this information would help to improve knowledge on pest dispersal and pathways, thereby informing future surveillance and pest management needs.

Goal 3

IMPROVE SURVEILLANCE DELIVERY

Rationale

Field surveillance skills vary across government and industry surveillance practitioners such as permanent surveillance staff, contractors employed to deliver emergency response surveillance, agricultural consultants, agronomists and crop scouts. The development of skills is often restricted to particular activities and experience is learned on the job and built over time.

While there is a range of support material and training for surveillance and crop monitoring across both industry and government, delivery, development and distribution of those materials are variable and not coordinated or captured at a national level. In general, it is challenging for both industry and government surveillance practitioners to develop field surveillance skills.

The current variability in skills represents an impediment to achieving consistency in surveillance delivery including surveillance data not meeting minimum standards. Future investments in field surveillance skills training are needed. Equally, specific technical guides and reference material need to be developed and made accessible to the entire surveillance community.

Actions

3.1 Build capacity and capability for surveillance

3.1.1 Identify and deliver training for industry and government personnel to improve surveillance outcomes

Providing surveillance training to industry and government personnel will increase the capacity and capability of practitioners in surveillance. This will bring benefit in day-to-day operational activities and contribute to 'blitz' campaigns and delimiting surveillance in the event of a detection of an exotic pest.

3.1.2 Identify opportunities for industry practitioners to be involved in structured government surveillance programs

Involving industry in government structured surveillance will bring multiple benefits, including increasing the capacity of surveillance through the government–industry partnership model, building professional relationships between industry and government personnel, increasing industry capacity in pest identification and surveillance methodology and increasing government staff understanding of commercial production practices.

3.2 Improve surveillance outcomes in urban and peri-urban environments through the development of industry supply chain and community partnerships

3.2.1 Identify partners and opportunities within allied industries (e.g. tourism, transport, logistics) and the urban, peri-urban and indigenous communities to identify opportunities for surveillance

Within industry and community, sites managed by supply chain partners and community gardens, parks and schools provide an opportunity to establish sentinel sites. Developing strong relationships with key supply chain partners and community groups will result in an improved understanding of the importance of surveillance in protecting agriculture and the environment from exotic pests. Identifying these key partners and establishing surveillance activities in the form of sentinel sites, awareness programs or 'blitz' campaigns will focus the surveillance activities of individuals and groups with an interest in protecting plant industries or the environment.

3.2.2 Engage with targeted groups within communities and industry to support surveillance through undertaking surveillance in off-farm sentinel sites and networks

Using sites and networks such as schools, community gardens and small non-commercial orchards in urban and peri-urban environments has several benefits. These locations and networks can be sentinel sites for new pests, and if a new pest is detected, there may be an opportunity for eradication prior to its spread to commercial production sites. Additionally, surveillance at sentinel sites outside of plant production businesses removes the barriers associated with growers being 'first reporters' and provides an opportunity to develop partnerships with community members. This is especially important in northern Australia where the peri-urban community extends over significant land areas and has strong linkages with both urban and rural communities.

3.2.3 Develop material and provide training and support to undertake surveillance

Developing and delivering training to partners will build capacity for ongoing surveillance in communities and will provide confidence in the data collected.

3.3 Adopt tools, technology and systems to improve surveillance

3.3.1 Investigate and adopt appropriate technology that supports surveillance in northern Australia

As new technologies are developed, the opportunities for their application in surveillance must be investigated to ensure the surveillance and biosecurity system remains effective and efficient.

3.3.2 Develop surveillance protocols and systems to improve consistency of surveillance efforts

To ensure consistency across surveillance efforts, activities should be guided by the development and implementation of nationally recognised surveillance protocols. The development and deployment of systems that improve the collection of surveillance data will also be essential to build surveillance capacity and contribute to collation of data and information within and between governments, industries and regions.

3.3.3 Identify and/or establish portals or platforms to share surveillance material and information

The ability to share data and information within and between governments and industries will improve transparency of surveillance efforts and contribute to a partnership approach that contributes to building a national biosecurity system. Development and implementation of systems to share information will support a network of surveillance practitioners and build capacity and capability in northern Australia.

Goal 4

ENSURE AVAILABILITY OF FUTURE DIAGNOSTIC SERVICES

Rationale

Australia's biosecurity diagnostic capability is comprised of experts familiar with many of the relevant pest groups of importance to commercial crop production and native taxa. Despite much of the native taxa being undescribed, many of the significant exotic plant pests can be identified, supporting biosecurity decision making.

Diagnostic workload generated by surveillance activity in northern Australia can include several distinct suites of plant pests, such as:

- an array of native and introduced pests that regularly affect cultivated crops across Australia, a subset of these which are solely tropical
- native organisms which occasionally occur as pests on tropical crops
- introduced exotic pests that have recently arrived.

Of the native organisms in the tropics, many are yet to be described or understood. They form part of the 'background noise' when conducting identification and therefore diagnostic tools need to cope with them as well as the target organisms.

In northern Australia, diagnostic service delivery for plant pests occurs through a national network of diagnosticians. The majority of specimens are triaged by staff working within the four government biosecurity organisations: the Department of Primary Industries and Regional Development (DPIRD) based in Perth; the Department of Industry, Tourism and Trade based in Darwin; the Department of Agriculture and Fisheries (DAF) based in Brisbane; and the Department of Agriculture, Water and the Environment's Northern Australia Quarantine Strategy (DAWE NAQS), based in Darwin and Cairns. In addition, specific diagnostic services are provided directly to plant industries through government researchers affiliated with the particular industry or through private laboratories in Australia or overseas.

Diagnostic and taxonomic experts are retiring, succession planning for their skills is rare, and these skills are no longer being created within Australian universities. This declining diagnostic capability and capacity is a significant risk to future surveillance outcomes.

While the current government-generated biosecurity surveillance needs are resourced, diagnostic capability will need strategic consideration and investment to ensure capability is appropriate to support future surveillance objectives. Objectives include increased surveillance in urban, peri-urban and production environments, surge capacity to respond to new pest detections, and a potential increase in diagnostic support for industry-led programs.

To address these issues, considerable investments have been made to develop diagnostic tools that help identify pests. To support industry to detect new pests, documents, manuals and diagnostic keys should be shared and training provided.

Actions

4.1 Build capacity and capability to improve delivery of diagnostics to support surveillance outcomes

4.1.1 Explore and improve resourcing to support diagnostics for biosecurity surveillance from industry, urban and peri-urban sources

Declining diagnostic capability is a significant risk to future surveillance outcomes, and improvements to surveillance efforts in industry, urban, peri-urban and remote communities will require associated expansion of diagnostic capacity and capability.

4.1.2 Establish and support networks within and across industry agronomists and crop scouts to improve in-field detection

With such diverse cropping across northern Australia and with limited numbers of skilled diagnosticians, a network that supports in-field detection of pests will be critical to support improved surveillance outcomes. A network will be especially important for graduates entering the industry and for crop scouts and agronomists working with or supporting new or emerging crops and regions.

4.1.3 Identify and support platforms to share diagnostic tools and methods between government and industry

The development of a collaborative partnership for surveillance will increase the opportunity for sharing of diagnostics tools and methods.

4.1.4 Collate and share the information relating to pest–host associations in northern Australia

As the area under crop production increases in northern Australia and new crops are introduced, there is potential for new pest–host associations to develop. An increased understanding of these pests and hosts across the region will improve decision making.

4.1.5 Expand diagnostic training opportunities to industry stakeholders

Increasing the diagnostic capability of industry personnel will increase their value to industry and lessen the burden on government diagnosticians.

4.2 Adopt tools, technology and protocols for diagnostics

4.2.1 Invest in diagnostic research to identify undescribed endemic organisms common on crops

Many pests that are endemic to Australia can be found in the natural environment or on crops but cause little impact on production. As they are considered of minor impact, little research has been conducted and they remain largely undescribed. In the event of an exotic pest incursion, a lack of diagnostic capability to quickly differentiate between an undescribed endemic pest and an exotic pest can cause significant delays in a response. Improving the ability to accurately identify endemic pests will improve timely and accurate diagnosis of new potentially more damaging pests in plant production industries.

4.2.2 Build, adopt and adapt interactive digital tools to help detect and identify common pests of commercial crops in northern Australia

With increasing development of agriculture in northern Australia there is likely to be increasing pressure from established pests on crops introduced into new areas. Development of new tools to increase the speed and accuracy of diagnostics will support the expansion of new crops, or crops into new regions.

4.2.3 Build diagnostic capability for key pest threats for northern Australia

Maintaining and building diagnostic capability for important established and exotic pest threats will support both the expansion of agriculture and horticulture in northern Australia and surveillance for exotic pests should they enter the region.

Goal 5

IMPROVE SURVEILLANCE DATA CAPTURE, QUALITY AND ACCESS FOR STAKEHOLDERS

Rationale

Information about the presence or absence of a particular pest is the product of surveillance and the quality of information or data influences appropriate biosecurity and business decisions. Ensuring that surveillance practitioners understand how surveillance data supports these decisions ensures good data are collected. As we increasingly require data to support market access, development and promotion of data standards and data capture tools will be required.

There is a diverse and increasing industry focus on development of farm management software for agribusiness. Software often includes components or modules designed to capture information about the presence or absence of pests on a given crop that are primarily linked to crop protection decisions and quality management of the product. While many of these software products have significant potential to capture structured surveillance data, they rarely meet the surveillance data standards mentioned above. Nor are they able to share and provide information for a national picture of pest distribution. Further communication and adoption of surveillance data standards is necessary as well as discussion on the value of a shared approach to surveillance datasets.

Data are required for particular markets and are collected by those businesses exporting product. Surveillance requirements are determined by the biosecurity agency in the country to which the product is exported. These export related surveillance data are kept by each business and not usually provided to industry bodies or government, unless required. Most export datasets are well structured and the longitudinal nature of collection (through repeated seasons) represents powerful evidence of absence for regions as well as the property involved. Capture of these data will require commercial in-confidence and privacy issues associated with sharing export data to be addressed if they are to be used for biosecurity decision making, as the data has significant potential to demonstrate pest freedom which is currently not utilised.

Information management policy of governments is shifting towards an open access culture. However, the biosecurity system can involve trade sensitivities, privacy issues and competitive attitudes within industries.

These issues have created an environment where surveillance data are rarely shared, unless there is a clear direct need identified. While this risk-averse culture reduces the likelihood that information may be misinterpreted or misused, it does not empower stakeholders across the system to contribute fully and reduces opportunity for efficiency and synergies.

Actions

5.1 Increase and encourage data sharing to support surveillance

5.1.1. Develop and implement platforms or portals to share surveillance intelligence and data within and between industries and governments

Implementation of a portal for aggregating, storing and sharing pest data (e.g. AUSPest*Check*™) will allow industry and government stakeholders to contribute and analyse information that supports the surveillance system. This will provide greater information sharing and help build a collaborative approach to surveillance.

5.1.2 Share industry and government data on surveillance and host–pest associations to support planning, prioritisation and capacity building for crop production and market access outcomes in northern Australia

The ability to visualise and use available data from many different sources will be important to increase the efficiency and effectiveness of surveillance efforts, as well as identify and fill gaps to support crop production, early detection, and market access outcomes.

5.1.3 Establish ability to collect and manage information about geographic spread of significant pests

Collation of information into AUSPest*Check*™ provides the ability to assess the spread of pests, delivering information on the effectiveness of surveillance and movement controls. Where pest spread cannot be controlled, information on dispersal can provide early intelligence to enable management systems to be put in place.

5.2 Improve surveillance data quality

5.2.1 Develop, communicate and promote data standards to stakeholders in industry and government

The development and implementation of data standards for surveillance will ensure national consistency and help industry and government stakeholders provide data that can be analysed and reported, supporting outcomes for crop production, early detection and market access. Promoting data collection that is fit-for-purpose and supported by data collection methodologies will ensure that surveillance efforts are most effective.

5.3 Ensure effective data capture across the biosecurity system

5.3.1 Develop and implement data capture tools and technologies that support collection of surveillance information from industry, government and urban and peri-urban communities

To ensure the highest benefit is obtained from surveillance activities, information and data must be recorded. The development and implementation of tools for data capture that support the needs of industry, government and urban and peri-urban communities will ensure that the surveillance activities can be collated, analysed and reported.

5.3.2 Develop policy and collaborative agreements for data sharing

Policies, arrangements and agreements are required to ensure that stakeholders are able to support a surveillance system that promotes sharing of data for biosecurity decision making. Similarly, processes need to be established to encourage regular data sharing.

5.3.3 Provide feedback on the performance of the surveillance system

Systems will be required to ensure that surveillance data providers or owners receive timely feedback on surveillance efforts. Provision of feedback will help ensure that data providers remain engaged in the surveillance system and that ongoing identification and promotion of the benefits in providing information occurs.

Definitions and acronyms

TERM or ABBREVIATION	DEFINITION
Biosecurity community	A description of the people who are involved in biosecurity, either directly or indirectly. This community comprises a wide cross section of the general community including owners and staff of plant production businesses (e.g. farms, nurseries, logistics partners, markets, retail), industry representatives, department of agriculture or primary industry staff, researchers, environment managers and community members who grow plants in urban and peri-urban environments.
BQ	Biosecurity Queensland, part of DAFQ responsible for biosecurity.
DAFQ	Department of Agriculture and Fisheries, Queensland.
DAWE	Department of Agriculture, Water and Environment.
EPP(s)	Emergency Plant Pest(s) are defined within the EPPRD as those that meet one or more of the following criteria: ▪ **known exotic plant pest**, the economic consequences of an incident of which would be economically or otherwise harmful for Australia, and for which it is considered to be in the regional or national interest to be free of the plant pest. ▪ **variant form of an established plant pest** which can be distinguished by appropriate investigative and diagnostic methods, and which if established in Australia, would have a regional or national impact. ▪ **serious plant pest of unknown or uncertain origin** which may, on the evidence available at the time, be an entirely new plant pest, and which if established in Australia would have an adverse economic impact regionally and or nationally. ▪ **plant pest already found in Australia that**: i. is restricted to a defined area through the use of regulatory measures intended to prevent further spread of the pest out of the defined area or into an endangered area; and ii. has been detected outside the defined area; and iii. is not a native of Australia; and iv. is not the subject of any instrument for management which is agreed to be effective risk mitigation and management at a national level; and v. is considered likely to have an adverse economic impact such that an emergency response is required to prevent an incident of regional and national importance.
EPPRD	Emergency Plant Pest Response Deed. A formal legally binding agreement between PHA, the Australian Government, all state and territory governments and national plant industry body signatories. It covers the management and funding of responses to Emergency Plant Pest incidents.

TERM or ABBREVIATION	DEFINITION
Endemic pest	A pest which is native to Australia.
Established pest	A pest that is perpetuated for the foreseeable future, within any area and where it is not feasible (whether in terms of technical feasibility or a benefit–cost analysis) to eradicate.
Exotic pest	A plant pest which is not normally found in Australia.
First reporter	The first person/business to report a pest, which is subsequently identified as an exotic pest which may require a management/eradication response.
General surveillance	A process whereby information on particular pests which are of concern for an area is gathered from many sources.
High Priority Pest (HPP)	A plant pest that has been identified to have one of the highest potential impacts to a particular plant industry and is listed in a biosecurity plan or in Schedule 13 of the EPPRD. An outcome of a prioritisation process.
NAQS	Northern Australia Quarantine Strategy.
National Surveillance Protocol	A document recognised nationally which contains the key information about how to conduct surveillance for a pest in different situations.
NMDS	National Minimum Dataset Specification.
Northern Australia	For the purposes of this strategy, northern Australia is defined as the part of Australia north of the Tropic of Capricorn in WA and Queensland, and all of the NT.
NTDITT	Northern Territory Department of Industry, Tourism and Trade.
Plant Health Australia (PHA)	The national coordinator of the government–industry partnership for plant biosecurity in Australia.
Plant industries	Industries that produce agriculture, horticulture, forestry and amenity plants and plant products.
Peak industry body (PIB)	Peak industry bodies are recognised by the Australian Government as being the representative body for a specific industry. Most are signatories to the EPPRD.
Pest	The term pest includes insects, mites, snails, nematodes, or pathogens (diseases) that have the potential to adversely affect food, fibre, ornamental crops, bees, and stored products, as well as environmental flora and fauna.

TERM or ABBREVIATION	DEFINITION
Surveillance strategy principles	The TPIBSS is principle-based, which includes: ▪ surveillance undertaken with a collaborative approach to data sharing and analysis ▪ surveillance undertaken to agreed national standards ▪ data sharing in accordance to pre-agreed parameters ▪ confidentiality of data maintained within pre-agreed guidelines between all parties ▪ agreed collaborative arrangements ▪ agreed conflict resolution processes.
R&D	Research and development.
Regulated pathway	A pathway which or from which plants, plant products and other regulated articles are subjected to phytosanitary measures.
SPHD	Subcommittee on Plant Health Diagnostics. It aims to sustain and improve the quality and reliability of plant pest diagnostics in Australia.
SNPHS	Subcommittee on National Plant Health Surveillance. The principal focus is to maintain and improve Australia's plant health surveillance capacity and capability in support of the economy, environment and community.
Specific surveillance	A surveillance activity conducted over a defined period of time that records the detection of, or confirms the absence of, specific pests.
Surveillance	Processes which collect and record data on pest occurrence or absence by survey, monitoring or other procedures.
TPIBSS	Tropical Plant Industries Biosecurity Surveillance Strategy.
Tropical plant industries	Tropical plant industries include those with substantial production in northern Australia, such as avocados, bananas, citrus, lychees, mangoes, melons, papaya, passionfruit and sugarcane.
WA DPIRD	Western Australia Department of Primary Industries and Regional Development.

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