frontier economics

Sustainable funding for biosecurity – an evaluation of funding options

A Report for the Invasive Species Council | 2 May 2023

Disclaimer

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1 Introduction

1.1 Background

Strong biosecurity – the "*controls and measures to manage and minimise the risks of pests, weeds and diseases entering, emerging or establishing and spreading within Australia*" [1] - is central to the protection of Australia's animals, plants, environments and people.

A sustainable funding approach, in turn, is critical to delivering a strong biosecurity system, and therefore, protecting Australia's economy, environment and communities. Funding arrangements have the capacity to influence the incentives of parties with interests in biosecurity outcomes, and therefore the efficiency and effectiveness of the arrangements.

However, in 2017, an independent review of biosecurity found that "*additional funding is required*"[2] for the national biosecurity system, including for environmental biosecurity. More recently, in 2021, the Inspector General of Biosecurity concluded that "*the biosecurity system is not in a strong position to address the diverse and evolving biosecurity risks and business environment*" – *for several reasons including the absence of an appropriate funding model*". [3]

1.2 Purpose and scope

Against this background, the Australian Department of Agriculture, Fisheries and Forestry (DAFF) is currently reviewing options for improving the sustainability of funding arrangements for Australia's biosecurity system.

To support the Invasive Species Council's involvement in this review, Frontier Economics is undertaking a high-level assessment of different funding mechanisms for biosecurity.

A number of potential funding mechanisms were outlined in DAFF's *Sustainable funding and investment to strengthen biosecurity: discussion paper*.[4] The Invasive Species Council has also asked Frontier Economics to identify and assess any other additional mechanisms that may be relevant for Commonwealth biosecurity functions.

1.2.1 Overview of our approach to developing this report

To ensure our analysis was based on the best available information, we undertook a review of key reports pertaining to national biosecurity as well as consultation with an expert in the field of national biosecurity.

[1] Department of Agriculture, Fisheries and Forestry (2022), *Sustainable funding and investment to strengthen biosecurity: discussion paper*, p.1.

[2] Craik. W, Palmer. D and Sheldrake. R (2017), *Priorities for Australia's biosecurity system: An independent review of the capacity of the national biosecurity system and its underpinning intergovernmental agreement*, p. 131.

[3] Australian Government, Inspector General of Biosecurity (2021), *Adequacy of department's operational model to effectively mitigate biosecurity risks in evolving risk and business environments*, p.4.

[4] Available at: https://haveyoursay.agriculture.gov.au/sustainable-biosecurity-funding

We subsequently identified key funding principles against which we would assess the funding mechanisms. These principles are based on well-established taxation and funding principles applied by a range of state and Australian Government agencies.

Box 1: Summary of our approach to the literature review and consultation

Some of the key literature reviewed includes:

- Australian Government Department of Agriculture, Fisheries and Forestry, *Departmental Charging Guidelines – Biosecurity and Export Regulatory Functions*, 2022.
- Australian Government Productivity Commission, *Regulation of Australian Agriculture*, Productivity Commission Inquiry Report, 2016.
- Centre of Excellence for Biosecurity Risk Analysis, '*Evaluating the health of Australia's biosecurity system*', CEBRA, 2020.
- Department of Agriculture, Water and the Environment, '*Commonwealth Biosecurity 2030*', DAWE, 2021.
- Ruth Ahchow, Garry Griffith and Susan Hester, '*Biosecurity in Australia: An Assessment of the Current Funding Approach*', Australasian Agribusiness Perspectives vol. 20, no. 8, 2017.
- Gary Stoneham, Susan Hetser, Johnny Siu-Hang Li, Rui Zhou & Atibhav Chaudhry, 'The Boundary of the Market for Biosecurity Risk', *Risk Analysis*, vol. 41, No. 8, 2021.
- The *National Environmental Biosecurity Response Agreement*, the *Emergency Animal Disease Response Agreement* and the *Emergency Plant Pest Response Agreement*.
- Wendy Craik, David Palmer and Richard Shelldrake, '*Priorities for Australia's biosecurity system: An independent review of the capacity of the national biosecurity system and its underpinning intergovernmental agreement*', Department of Agriculture and Water Resources, 2017.

Consultation was also undertaken with:

- Ian Thompson - former Chief Environmental Biosecurity Officer, current Chair of the Conservation & Science Committee, Invasive Species Council

Source: Frontier Economics

1.2.2 Limitations of this review

In undertaking this assessment of possible mechanisms for funding biosecurity, we have sought to draw upon the best available information.

However, this analysis has been developed in a compressed timeframe and an evolving policy environment. This has resulted in reduced certainty regarding several key parameters and has required us to make several key assumptions in collaboration with the Invasive Species Council. This includes:

- We have limited the scope of analysis in this report to Commonwealth activities and funding mechanisms. In practice, biosecurity measures are delivered by all levels of government (and

in some cases, co-funding between the States and the Commonwealth). This is significant given the States and Territories are generally responsible for managing biosecurity risks within their own borders whereas the Commonwealth is responsible for most biosecurity measures up to and including at the border.

- We have not undertaken an assessment of the overall adequacy of funding for national biosecurity nor a detailed review of the appropriateness of current cost sharing arrangements between the States and the Commonwealth.
- We have not assessed the current contribution of existing funding mechanisms or sources of co-funding to biosecurity.
- There is incomplete data available on the range of investments and contributions for national biosecurity. This means there is no comprehensive overall picture on the total biosecurity spend nor the contribution coming from different parties.
- We have not assessed the feasibility of funding mechanisms from social, political, legal, environmental and cultural viewpoints which may be critical to their successful implementation.
- We have assessed each mechanism individually on its merits. However, in practice, the most appropriate funding approach is likely to involve a mix of different funding mechanisms (i.e. there is unlikely to be a single funding mechanism that is best placed to fund all biosecurity measures).
- As this analysis is concerned with biosecurity funding, it has not considered other options available to assist in delivering biosecurity, such as financing options or the cost reduction mechanisms (i.e. mechanisms that reduce the costs of biosecurity, for example, by reducing the costs of compliance or alternative governance / provision arrangements).

Identifying the appropriate mix of biosecurity funding mechanisms requires a co-ordinated and holistic approach to the assessment and delivery of funding. This includes improving transparency around existing and future biosecurity expenditure from industry and government, identifying risk creators and beneficiaries and, ultimately, addressing funding gaps in adherence to clear funding principles.

1.3 Structure of this report

The remainder of this report is structured as follows:

- **Section 2** summarises the Australian biosecurity system and current funding arrangements.
- **Section 2** details the approach and methodology employed for the assessment and analysis of the funding mechanisms. This includes funding principles against which the funding mechanisms are assessed.
- **Section 4** outlines the results and discussion of our assessment.
- **Section 5** summarises the key findings of our analysis.

2 Background

Australia's biosecurity system plays an essential role in maintaining the strength of our economy, protecting our environment and biodiversity and supporting our way of living. Incorporating financial, social, cultural and environmental dimensions, our national biosecurity system has been valued at $314 billion.[5]

This section provides a brief overview of Australia's biosecurity system and current funding arrangements.

2.1 The costs and benefits of biosecurity measures

Whenever people or goods come into Australia there is a risk of a pest and/or disease entering the country. This in turn can potentially cause significant health, economic and/or environmental costs to the community. Costs may include:

- **Response/management cost**: where entry of a biosecurity threat triggers effort needed to detect, control, and eradicate (where feasible) the threat.
- **Loss of sales revenue**: where a pest or disease results in a loss of access to markets (nationally or internationally) or causes a lower quality product and/or higher costs of production. These losses may be confined to a particular agricultural industry or spill over into other sectors such as tourism.
- **Environmental and social costs**: where a pest or disease impacts other community outcomes, such as the health of Australia's biodiversity.

The main benefits from biosecurity management relate to avoiding the costs above.

As discussed in **Box 2**, the costs of biosecurity activities will generally be a function of a number of factors, chief of which is the type of activities that need to be implemented and the duration over which they are implemented. These will, in turn, be determined by the epidemiological characteristics of the pest or disease, its regional prevalence, whether it is endemic or not and the nature of the industry or industries affected.

Importantly, many of these factors also determine the benefits that accrue in terms of costs foregone. For example, the extra benefits of attempting to contain the incidence of a disease below a certain level may be relatively small compared to the added costs of the action involved. Alternatively, the nature of sanitary and phytosanitary rules prevailing in markets in which an industry sells its products, which determine market access losses, will also be influential in determining the type of control actions undertaken, the intensity (in terms of frequency or duration) with which such actions are undertaken and finally, the costs such actions incur.

Given these linkages, the optimal choice of biosecurity measures is likely to be one that minimizes overall social costs (i.e. the costs of biosecurity measures) and maximises social benefit (i.e. the avoided impact of the disease or pest).

[5] Dodd A, Stoeckl N, Baumgartner J, and Kompas T, *Key Result Summary: Valuing Australia's Biosecurity System CEBRA Project 170713*, August 2020, p v.

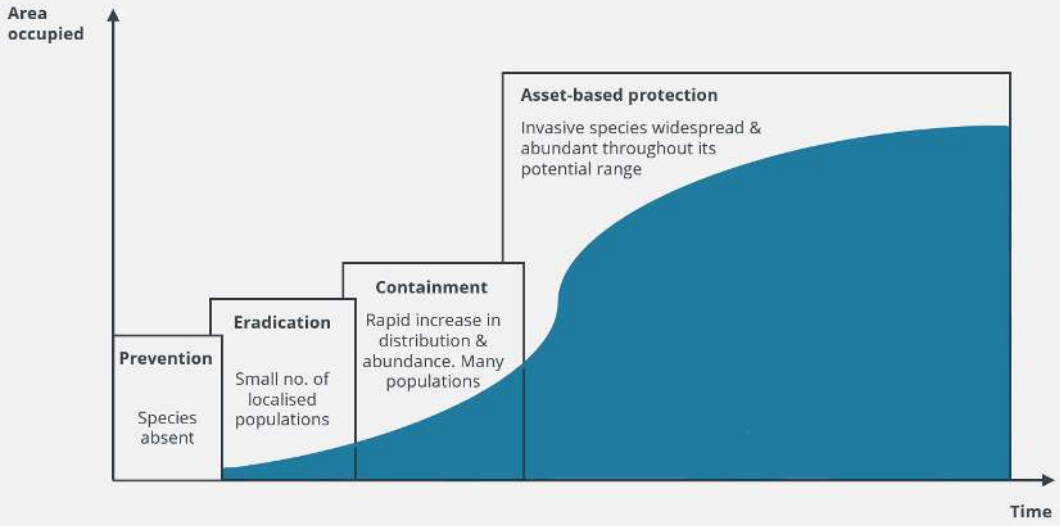
Box 2: Biosecurity activities

The activities involved in biosecurity can be described by the generalised invasion curve (**Figure 1**). This sets out the different responses to biosecurity risks, including:

- **Prevention** – keeping pests and diseases from entering Australia (including quarantine and offshore inspections)
- **Eradication** - eliminating a threat within Australia, to prevent it from establishing further
- **Containment** - restricting a pest or disease to a defined area and limit its spread and impact, and
- **Asset-based protection** - for pests and diseases that are so widespread that eradication and containment are no longer feasible.

It is generally considered that preventative biosecurity activities provide the greatest return on investment. The return on investment then falls when moving from prevention through the reactive measures of eradication and containment and finally the lowest return is associated with protecting assets from a widespread incursion.

Figure 1: Generalised invasion curve



Source: Adapted from Victorian Government (2010) Invasive Plants and Animals Policy Framework, DPI Victoria, Melbourne.

2.2 The need for Government involvement in biosecurity

From an economics perspective, the optimal investment in biosecurity would be the point where the marginal cost of biosecurity activities is equal to the marginal social benefit.

However, as these costs are 'externalities' that are imposed on other sectors of the community (i.e. not borne by parties importing goods into the country), they are not necessarily considered by the individuals or businesses when deciding whether to import goods or people into Australia. This means that, in the absence of government involvement in biosecurity, there is likely to be:

- over-provision of activities that increase Australia's exposure to biosecurity risk; and
- under-provision of biosecurity management activities that could deliver biosecurity benefits to the community.

The net effect of these two impacts is likely to result in a net cost to the Australian community.[6]

This relationship was also noted by the Productivity Commission:

> *Biosecurity has both public good properties and spill-over effects (externalities). A pest- and disease-free environment is a public good. If providing such an environment was left to the private sector, this could lead to free-riding on the management efforts of others and result in underinvestment in biosecurity activities. This failure of the market to adequately address pest and disease risks is a major reason for government involvement in biosecurity.*[7]

2.3 The Australian biosecurity system

Australia's biosecurity system is based on the principle of shared responsibility across the biosecurity continuum (**Box 3**). It relies on cooperation between the Commonwealth, State and Territory governments, industry and the wider community to deliver measures overseas, at our border and within Australia. For example:

- The responsibility for minimising the likelihood of pests and diseases entering the country both pre-border and at the border (including quarantine) primarily lies with the Commonwealth Government (DAFF). DAFF also coordinates responses to outbreaks within Australia.
- Within Australia, management of biosecurity is shared between Commonwealth, State and Local governments, industry groups, producers, research organisations and the community.
- The states and territories are largely involved in biosecurity surveillance and diagnostics activities. Many farm and agricultural businesses comply with biosecurity regulations including, for example, fumigating crops, controlling weeds, and treating infected animals, and contribute to broader measures by industry such as responses to outbreaks. The community also plays a role in alerting authorities to biosecurity risks.

[6] Further discussion on the justification for public funding for biosecurity is contained in Frontier Economics, *Mechanisms for Funding Biosecurity – Report prepared for the Department of Primary Industries Victoria*, November 2008. https://www.frontier-economics.com.au/documents/2014/06/mechanisms-funding-bio-security-measures.pdf/

[7] Australian Government Productivity Commission, *Regulation of Australian Agriculture*, Productivity Commission Inquiry Report, 2016, p 319.

Box 3: The biosecurity continuum

Overseas - The Australian Government and importers work with overseas counterparts to identify and mitigate biosecurity risks before they reach our border, while also undertaking capacity building activities to further our biosecurity, trade, security and national interests. Overseas partners and industry provide vital intelligence on risks and traceability of products to support this work.

At the border - Regulatory, surveillance and quarantine arrangements are in place to prevent, detect and intercept risks at our national border before they can do us harm. The Australian Government operates border controls, including screening, assessment, inspections and quarantine processes, to support this effort. Travellers declare goods on arrival and industry has systems in place to proactively manage risks, applying treatments where needed and participating in surveillance activities.

Within Australia - Industry, governments, Natural Resource Management (NRM) organisations, environmental groups, landowners, land managers and the wider community work at regional and local levels to prevent, plan for, detect and respond to outbreaks. The Australian, State and Territory governments lead regulatory activities. Industry and governments coordinate and fund management and response activities under a range of deeds and agreements and all system participants work together on the ground to reduce the possibility and impact of further spread within and across borders. The general public plays a critical role in surveillance and the reporting of pest, weed and disease outbreaks. Research organisations work to enhance our understanding of biosecurity risks and examine new approaches to improve our system in areas like diagnostics, containment and treatments.

Source: DAFF, National Biosecurity Strategy, Department of Agriculture, Fisheries and Forestry, Canberra, August 2022.

2.3.1 Intergovernmental Agreement on Biosecurity

The Intergovernmental Agreement on Biosecurity (IGAB) is a key component of Australia's biosecurity system. The IGAB defines the goal and objectives, and clarifies the roles, responsibilities, and governance arrangements, that guide the Commonwealth, States and Territories in supporting the national biosecurity system.

The IGAB recognises that many pests and diseases are a national issue, and therefore aims to create a coordinated approach to their management.

A fundamental principle of this agreement is the Appropriate Level of Protection (ALOP). Australia's ALOP is expressed as providing a high level of sanitary and phytosanitary protection aimed at reducing risk to a very low level, but not to zero.[8]

[8] For further information see, https://www.agriculture.gov.au/biosecurity-trade/policy/risk-analysis/conducting/appropriate-level-of-protection.

2.4 Biosecurity funding

The effectiveness of Australia's biosecurity system relies on sustainable funding that is well-targeted across the biosecurity continuum.

The challenge for policymakers is that there are a large number of biosecurity threats, and each can be managed through a combination of activities across the biosecurity continuum. Biosecurity threats and actions can also be interrelated. This makes an optimal investment in biosecurity difficult to determine. In practice, governments and industry have limited resources, so there is a need to prioritise biosecurity investment subject to the available funding.

Given the public and private good characteristics of biosecurity and the concept of shared responsibility, it is generally accepted that funding for biosecurity should come from government and industry. Clause 16 of the IGAB, states:[9]

> *Governments contribute to the cost of risk management measures in proportion to the public good accruing from them. Other system participants contribute in proportion to the risks created and/or benefits gained.*

This cost-sharing principle is reflected in the current sources of biosecurity funding. While the arrangements are complex, funding sources for Commonwealth biosecurity measures broadly include:

- Budget appropriations from the Commonwealth Government out of general taxation funds
- Industry cost-recovery through fees and charges
- Levies
- Financial, in-kind and voluntary contributions made by landholders and industry participants.

Funding mechanisms are further discussed in **Section 3.3**.

There is incomplete data available on the range of investments and contributions for national biosecurity. This means there is no comprehensive overall picture on the total biosecurity spend nor the contribution coming from different parties. Accordingly, it is difficult to assess how well the cost sharing principle is being applied in practice.

2.4.1 Adequacy of funding

Despite a lack of comprehensive funding data, numerous reports have identified the need for more sustainable funding arrangements for biosecurity including environmental biosecurity.

For example, the Inspector-General of Biosecurity noted "*the concept of a sustainable funding model for biosecurity has been raised in review after review for over a decade*".[10]

[9] We note there is also a *National Framework for Cost Sharing of Biosecurity Programs* however this is not publicly available and we have not accessed this document.

[10] Ibid, p8.

A 2017 independent review into the capacity of Australia's biosecurity system noted:

> *"...there is widespread support for the view that the national system is currently underfunded and that, in particular, there is inadequate funding for those areas where the greatest return is likely to be achieved. These include the prevention activities on the left-hand side of the invasion curve model..."*[11].

While cost-recoverable biosecurity measures are able to increase or at least maintain a minimum level of funding in line with demand, non-cost recoverable functions (for example, those funded through general appropriation) are not. This is due to two factors:

- Firstly, general appropriation is largely discretionary, highly variable and a bit of a 'black box'. That is, the departments responsible for administering and undertaking biosecurity functions are required to undertake their activities within a given budget that is likely loosely tied to highly uncertain cost estimates.
- Secondly, biosecurity funding sourced through appropriations must compete for the same pool of general appropriation funding as other government activities, like health and education. These issues are further exacerbated by the increasing complexity and risk associated with biosecurity threats.

As a consequence, there has been an observation of an escalating trend of biosecurity funding becoming 'decoupled' from biosecurity risk.[12] Biosecurity risk is largely associated with the volume of trade and people movement and by extension, pathways of entry into the nation. At present, low-value trade and the movement of people are largely not cost-recovered. Therefore, as trade or the people movement increases, there is no guarantee of adequate funding to cover the associated increase in biosecurity risk management activities required.

[11] Craik, W, Palmer, D & Sheldrake, R, *Priorities for Australia's Biosecurity System: An Independent Review of the Capacity of the National Biosecurity System and its Underpinning Intergovernmental Agreement*, 2017, p 114.

[12] Australian Government Inspector-General of Biosecurity, Adequacy of department's operational model to effectively mitigate biosecurity risks in evolving risk and business environments, 2020, p 66.

3 Overview of our approach

This section outlines our approach to our assessment of biosecurity funding mechanisms, including an overview of:

- the relevant costs of biosecurity measures
- potential sources of funding and co-funding and the funding hierarchy (impactors, beneficiaries and government)
- the funding mechanisms to be assessed
- the funding principles we used for the assessment, and
- the 'traffic light' approach we used to rate mechanisms against each principle.

3.1 Identifying the range of costs to be funded

Given the timeframe for this analysis, for simplicity, we have adopted the high-level description of biosecurity costs outlined in **Section 2.1** of this report. That is, the range of costs include:

- **Prevention** costs
- **Eradication** costs
- **Containment** costs
- **Asset-based protection** costs

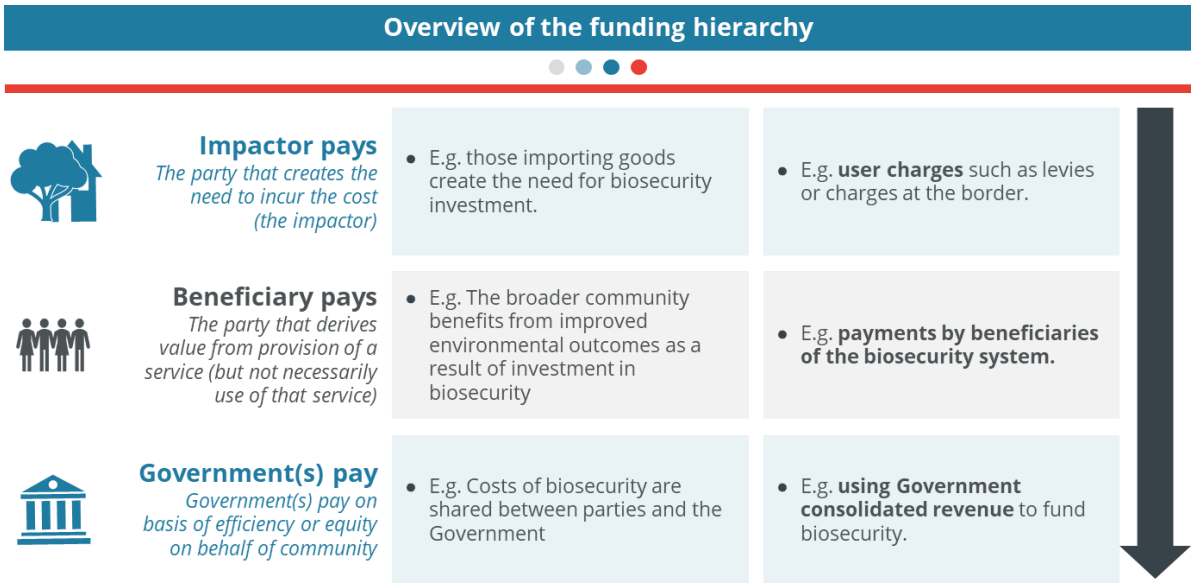
3.2 Identifying possible sources of funding

As shown in **Figure 2**, there are three broad funding approaches to recover the costs above, namely:

- **Impactors pays**, where costs are recovered from the party that created the need to incur the cost (i.e. the impactor or 'risk creator');[13]
- **Beneficiary pays**, where those who benefit from an action contribute to the costs of the action. Under this principle, the costs associated with services are allocated to individuals or groups in proportion to the benefits they derive from such services. In this case, beneficiaries may include:
  - **Direct beneficiaries**: those who derive a direct private benefit from the activity, such as the agricultural industry benefiting from reduced risk of pests.
  - **Indirect beneficiaries**: those who derive an indirect benefit, such as the broader community which benefits from healthy waterways and biodiversity.
- **Government(s) pays**, where the costs of providing a service are recovered from government on behalf of the community, on the basis of efficiency or equity.

[13] Under the impactor pays approach, costs are allocated to different individuals or groups in proportion to the contribution that each individual or group makes to creating the costs (or the need to incur the costs).

Figure 2: Establishing the funding hierarchy



Source: Frontier Economics

While the appropriate cost recovery mechanism will vary depending on a range of **issues, as 'impactor pays' is the approach that most closely links the costs of providing the service with the user of the service, from an economic perspective funding ideally should be sought from impactors first, then beneficiaries, and finally, government**.

3.2.1 Comparing impactor pays and government pays

A key reason for the adoption of the 'impactor pays' rather than 'beneficiary pays' principle is that the latter approach can give rise to inefficient use and investment in services. This is because the parties that benefit from a service (and hence pay for the service under a 'beneficiary pays' approach) may not be the ones who cause the costs or create the need to incur costs. This may, in turn, lead to excessive consumption of services or dampen investment incentives for service providers. An impactor pays approach is more likely to better signal the costs to users and other parties, and so is more likely to promote economically efficient outcomes.

However, in some cases, impactors and beneficiaries may be the same parties – for example, tourism, agriculture and various other sectors create a need for biosecurity measures, but they also benefit from the provision of services.

In addition, in some cases it may be appropriate to seek funding from government on behalf of the community (i.e. "Government pays") when:

- It may not be efficient or effective to charge impactors or beneficiaries (for example, it may be too difficult to identify impactors or design an effective funding mechanism to recover costs from impactors or beneficiaries)
- relying on these funding mechanisms may risk investment not occurring in what would otherwise be a socially beneficial investment.
- there may be broader equity concerns from funding directly from either impactors or beneficiaries.

With respect to Commonwealth biosecurity measures, businesses that import or move people around are often both the primary impactors and beneficiaries. However, there are often benefits that extend beyond these parties, including to the Australian community. Given the size of biosecurity investments required, there may be a case for seeking supporting funding from these beneficiaries (or Government on behalf of impactors or beneficiaries[14]) on efficiency, equity and dependability grounds. This is particularly the case when recovering the entire investment from impactors alone results in imposing charges of a size that risks the delivery of socially optimal services. If cost recovery were to compromise the core activities of a given measure, and the measure has a demonstrated net benefit to society, then funding from Government may be appropriate.[15]

3.3 Overview of funding mechanisms assessed

We have evaluated seven funding mechanisms (**Table 1**). The first six mechanisms were included in DAFF's *Sustainable funding and investment to strengthen biosecurity: discussion paper.* The seventh mechanism, risk insurance, was put forward in response to the discussion paper and has been discussed in other contexts for biosecurity funding.[16] [17]

In our view, these seven mechanisms represent the broad range of funding options available to seek funding from impactors, beneficiaries or government.

As this analysis is concerned with biosecurity funding, it has not considered other options available to assist in delivering biosecurity, such as financing options or the cost reduction mechanisms mentioned in DAFF's discussion paper (i.e. mechanisms that reduce the costs of biosecurity, for example, by reducing the costs of compliance or alternative governance / provision arrangements). These mechanisms can include:

- Expanding the delivery of biosecurity services to third parties within and outside government
- Increasing investment in systems and technologies to reduce risk & drive efficiencies
- Removing unnecessary compliance costs (incentivise good behaviour & remove redundant requirements).

[14] Government funding is often accessed in lieu of contributions from the broader community where they are beneficiaries and there are significant transactions costs associated with collecting contributions from those beneficiaries.

[15] New South Wales Treasury, *TPG23-08 NSW Government Guide to Cost-Benefit Analysis*, February 2023.

[16] See submission from the Centre of Excellence for Biosecurity Risk Analysis and Centre for Market Design, available at: https://haveyoursay.agriculture.gov.au/81417/widgets/394904/documents/250584

[17] Wendy Craik, David Palmer and Richard Shelldrake, *Priorities for Australia's biosecurity system: An independent review of the capacity of the national biosecurity system and its underpinning intergovernmental agreement*, Department of Agriculture and Water Resources, 2017, p 121-122.

Table 1: Summary of funding mechanisms assessed

Funding mechanism	Description
Increased budget appropriation	Additional funds set aside for biosecurity from the Commonwealth budget
Expanded or reformed industry cost-recovery (pre-border and at border)	Expansion or reforms to DAFF's fees to recover the cost of biosecurity services to specific individuals or business organisations. While there are numerous examples for this mechanism, we have focussed on expansion of cost-recovery for self-assessed clearances (SAC).
Air and sea-freight conveyance or container levies	Charges imposed when biosecurity services are provided to a group of individuals or organisations (rather than to a specific individual or organisation)
Enhanced cost-recovery from other government agencies	Enhancements to cost recovery for biosecurity services provided to other government agencies, for example the Department of Defence and the Department of Health, noting that some already contribute to biosecurity-related activities.
Increased passenger movement charge (PMC)	An increase to the current PMC of $60 for the departure of a person from Australia for another country, whether or not the person returns to Australia. The increase would be specifically used to fund biosecurity activities
Payments by beneficiaries of the biosecurity system	Levies or charges levelled on groups that are vulnerable to biosecurity hazards and benefit from biosecurity control. For example, industry funding deeds for sectors not currently covered by industry deeds such as the Emergency Response Deeds already established between Animal Health Australia and Plant Health Australia.
Risk insurance	A forward-looking risk-based charge where biosecurity risk creators are charged the actuarial price of risk – higher premiums/charges for higher risk activities

Source: Frontier Economics

3.4 Assessment criteria

To assess the merits of different funding mechanisms for biosecurity, we have adopted criteria consistent with well-established taxation and funding principles applied by a range of agencies, including Australian Government agencies. These are summarised in **Figure 3**.

Figure 3: Assessment criteria for evaluating biosecurity funding models

Criteria	Summary
Efficiency	Ensuring resources are allocated in a way that maximises community wellbeing. For example, does the funding mechanism send appropriate signals about the biosecurity risks from an activity, to those that undertake the activity?
Equity	People in similar situations should be treated in similar ways
Adequacy & dependability	Ensuring a sufficient and reliable source of funding over time
Simplicity	Easy to understand, transparent and relatively inexpensive to implement and administer

Source: Frontier Economics

Further detail on the assessment criteria is provided below.

3.4.1 Efficiency

Efficiency can be thought of from the perspective of:

- **Impactor or risk-creator pays:** does the funding mechanism send appropriate signals about the biosecurity risks created from an activity to those that undertake the activity?
- **Beneficiaries:** does the funding mechanism promote net beneficial investment decisions by sending appropriate signals about the benefits from biosecurity investment to those beneficiaries?

In the context of biosecurity funding, the breadth of biosecurity risk management activities undertaken by the Commonwealth and the diversity of both current and potential funding mechanisms means there is often some complexity in understanding which groups are impacting, benefiting and funding different biosecurity activities. As such, it is often difficult to determine the degree of efficiency (as well as equity – see below) associated with some biosecurity funding mechanisms.

3.4.2 Equity

The equity principle relates to **whether a funding mechanism treats people in similar situations in similar ways** ('horizontal' equity) and ensure those who contribute to or benefit from an activity pay for it, rather than those who do not benefit?

Our assessment is not concerned with 'vertical' equity. Vertical equity relates to the idea that those who earn more should pay more for biosecurity. Vertical equity can be achieved through Australia's tax and transfer system.

3.4.3 Adequacy and dependability

The adequacy and dependability principle pertains **to whether a funding mechanism is likely to ensure a sufficient and reliable source of funding is available over time**. The adequacy and dependability principle therefore also requires consideration of how funding requirements may change over time and whether the adequacy and dependability principle will still hold in different states of the world.

It should be noted that no single funding mechanism is likely to be sufficient or appropriate to fund all biosecurity costs. As such, **our assessment of adequacy does not consider whether the mechanism is sufficient to fund all relevant costs**.

As noted above in **Section 2.4.1**, it has been observed recently in the Australian context that biosecurity funding has been increasingly 'decoupled' from biosecurity risk[18]. Part of this 'de-coupling' is the fact that while cost-recoverable biosecurity functions are able to increase or maintain their funding level in line with demand, non-cost recoverable functions funded through appropriation or other mechanisms are not and have therefore been increasingly struggling to maintain an adequate and dependable funding level and placing strain on the national biosecurity system. These outcomes underscore the importance of the adequacy and dependability funding principle.

3.4.4 Simplicity

The simplicity principle relates to the **extent to which a funding mechanism is easy to understand, transparent and relatively inexpensive to implement, administer and comply with**.

Simple funding mechanisms make it easier and cheaper for individuals, businesses and government to understand and comply with their obligations and makes it more likely that choices will be made that maximise positive biosecurity outcomes as intended. However, there is often a trade-off between simplicity of the funding mechanism and the degree to which complex risks and activities can be efficiently, equitably and adequately funded.

3.4.5 Criteria we have not assessed

It is important to note that we have not assessed whether a funding mechanism is feasible from a social, political, legal, environmental and cultural perspective. These are important factors that influence whether a funding mechanism for biosecurity can be established and implemented. However, we consider that given the limited scope of this project, the ISC would be better placed to assess the mechanisms against these considerations.

[18] Australian Government Inspector-General of Biosecurity, Adequacy of department's operational model to effectively mitigate biosecurity risks in evolving risk and business environments, 2020, p 66.

3.5 Approach to rating

Our assessment of biosecurity funding mechanisms adopts a 'traffic-light' assessment. The traffic-light assessment evaluates each funding mechanism against each of the criteria.

The 'traffic light' assessment functions such that:

- A '**red traffic light**' indicates that the funding mechanisms does not meet key aspects of the criteria.
- An '**amber traffic light**' indicates that the funding mechanisms meets some aspects of the criteria.
- A '**green traffic light**' indicates that the funding mechanisms substantially meets the criteria.

The 'traffic-light' assessment is not multi-criteria analysis (MCA) which involves subjectively weighting a range of different outcomes and we do not propose to assign weights to these evaluation criteria. Rather, it is a simple and easily understood method that can provide a consistent and transparent structure upon which subjective findings, recommendations and decisions can be made.

4 Results

This section summarises the findings of our assessment of the biosecurity funding mechanisms against our criteria.

4.1 Overview of results

Table 2 provides a summary of our assessment of each mechanism. Following this is further discussion. As discussed in more detail below, our assessment highlights that there is value in seeking additional funding from impactors and beneficiaries of biosecurity.

Table 2: Summary of funding mechanism assessment

	Efficiency	Equity	Adequacy / dependability	Simplicity
Increased budget appropriation				
Expanded or reformed industry cost-recovery – SAC charge				
Air and sea-freight conveyance or container levies				
Enhanced cost-recovery from other government agencies (e.g. health)				
Increased passenger movement charge (PMC)				
Payments by beneficiaries of the biosecurity system (funding deeds for industries not currently covered)				
Biosecurity risk insurance				

Source: Frontier Economics

When interpreting these results, it is important to consider:

- we have not assessed how feasible these funding mechanisms are from a social, legal, environmental, cultural and political perspective which may be very important factors for these mechanisms to be implemented.
- these results in light of the limitations of this analysis as outlined in **Section 1.2.2**.

- given information availability, we are not in a position to comment on the extent to which specific mechanisms (and therefore users) fund specific costs. As such, we have not commented on whether specific users should contribute more than other users. In theory beneficiaries should be willing to contribute up to the benefits that they receive.
- the results in **Table 2** should **not** be interpreted as one mechanism being 'better' or 'worse' than another. For example, while increased budget appropriation does not rate as well against most of the criteria it still is likely to play a role in overall biosecurity funding.
- There is a limit on how much granularity can be captured in the traffic light assessment, for example, even options that have the same traffic light for a given criteria may have slight differences in performance. As such, the table should be read alongside the remainder of this report.

4.2 Further discussion of results

4.2.1 Increased budget appropriation

Efficiency

Our assessment is amber/red on the efficiency criterion. An increased budget appropriation is a relatively blunt tool that is not very effective at sending price signals to the impactors / risk creators (about the costs they impose), or to beneficiaries (about the benefits they receive).

This is partially because, general appropriation is a bit of a 'black box', where the broader community contributes as part of general taxation, which in turn is used to fund biosecurity, rather than contributing specifically to the costs of biosecurity. This means there is little link between their contribution and the costs they are funding.

Equity

Our assessment is amber on the equity criterion. While budget appropriations ensure that beneficiaries of the biosecurity system are contributing to its costs, the costs are recovered from all taxpayers, not just those who benefit or cause the costs to be incurred.

Adequacy/dependability

Our assessment is amber/red for the adequacy/dependability criterion. The need for overall fiscal discipline makes it very challenging to ensure budget appropriations are adequate for biosecurity (particularly environmental biosecurity). Biosecurity funding sourced through appropriations must compete for the same pool of general appropriation funding as other government activities, like health and education.

Further, it would remain very challenging to ensure funding remains adequate over time, both due to ongoing competing priorities with other areas of government spending, and because the level of funding is not directly linked to the degree of risk or level of effort required for biosecurity activities.

Simplicity

Our assessment is green for the simplicity criterion. An increased budget appropriate does not require any new systems or legislation and there is transparency provided by budget reporting.

4.2.2 Expanded or reformed industry cost recovery (pre or at border)

As noted in **Table 1** in **Section 3.3**, for this mechanism we have focused on the example of cost recovery for self-assessed clearances (SACs). Self-assessed clearance cargo is non-commercial goods (including online purchases) imported into Australia with a value of less than or equal to the Full Import Declaration (FID) threshold. The FID threshold is currently $1,000.[19]

The independent IGAB review noted that the number of SACs has been growing rapidly in line with the trend for internet shopping. As there is no SAC levy/charge, some stakeholders are concerned that the costs of clearing low-value imports are being cross-subsidised by importers of other cargo. The panel encouraged the Australian Government to continue investigations into whether an efficient and effective charging mechanism could be found to recover costs.[20]

The Inspector-General of Biosecurity has made a similar observation about the growth in SACs and an outdated cost recovery model that needs to be more responsive to changing biosecurity threats.[21]

Efficiency

Our assessment is green for the efficiency criterion. Introducing a SAC charge would improve allocative efficiency by sending a price signal to some impactors (i.e. those who import goods) about the biosecurity costs they impose by importing goods.

Equity

Our assessment is green for the equity criterion. A SAC charge would improve equity as this pathway currently does not have a fee that sends signals to users that reflects DAFF's resource costs for clearances, whereas other pathways (e.g. container fees for regulatory activities) do.

Adequacy/dependability

Our assessment is green for the adequacy/dependability criterion. A cost-recovery charge for SAC cargo could be adjusted annually in line with changes in the growth/costs from this pathway., to ensure that the funding receiving from this mechanism grows as the costs of biosecurity increase.

Simplicity

Our assessment is amber/green for the simplicity criterion. There are well-established principles for cost recovery that can be followed to introduce a SAC charge and annual reporting would provide transparency. Nonetheless, there would still be complexity associated with designing, implementing and administering a new SAC levy/charge.

19 https://www.agriculture.gov.au/biosecurity-trade/import/before/self-assessed-clearance-cargo

20 Wendy Craik, David Palmer and Richard Shelldrake, *Priorities for Australia's biosecurity system: An independent review of the capacity of the national biosecurity system and its underpinning intergovernmental agreement*, Department of Agriculture and Water Resources, 2017, p 123-124.

21 Australian Government Inspector-General of Biosecurity, Adequacy of department's operational model to effectively mitigate biosecurity risks in evolving risk and business environments, 2020, p 62-63.

Other comments

While we have not assessed the feasibility of this mechanism, we note that previous attempts to introduce a SAC charge of $5 per import of goods valued at less than $1,000 were labelled a 'parcel tax' and not pursued. Similar challenges may arise should this option be progressed.

4.2.3 Air and sea freight container levy

The Biosecurity Imports Levy was recommended as part of the 2017 independent IGAB review, where the panel noted:

> *Much of the material of concern to the national biosecurity system, including of environmental concern, arrives via vessels and containers—either in the contents of the container or on the external surfaces of the container itself. ..... The panel is of the view that a broad-based levy on containers should be implemented to contribute towards a greater effort on environmental biosecurity and improved national monitoring and surveillance generally.*[22]

The Australian Government announced the levy in the 2018-19 budget however following industry consultation and further consideration of the impacts on industry, a decision was made not to proceed with the levy.

Efficiency

Our assessment is green for the efficiency criterion. A container levy would promote allocative efficiency by sending a price signal for the biosecurity risk associated with container imports to impactors / risk creators (i.e. those who import the goods). This is particularly important for containers as they are a significant source of biosecurity risk.

Equity

Our assessment is green for the equity criterion. A container levy would improve equity as it would ensure that risk creators are treated in a similar way to other risk creators, particularly if it were extended to non-containerised incoming trade.

Adequacy/dependability

Our assessment is green for the adequacy/dependability criterion as this mechanism can be implemented with a levy that provides adequate funding and could be adjusted to reflects changes in the volume of material/risk over time.

Simplicity

Our assessment is green for the simplicity criterion. A container levy would be simple to implement as it has existed in the past. A charge of $30 per full container and $8 per partially

22 Wendy Craik, David Palmer and Richard Shelldrake, *Priorities for Australia's biosecurity system: An independent review of the capacity of the national biosecurity system and its underpinning intergovernmental agreement*, Department of Agriculture and Water Resources, 2017, p 120.

filled container has previously applied and covered the cost of DAFF examining 100% of sea containers. However, the levy ceased in 2015 following the change to risk-based inspections.

Other comments

While we have not assessed the feasibility of this option the previous Biosecurity Imports Levy was not progressed and there remain outstanding issues from the 2019 Biosecurity Imports Levy report.[23]

4.2.4 Enhanced cost-recovery from other government agencies

We acknowledge that some Australian Government agencies, such as the Department of Defence contribute to some biosecurity-related activities.

This mechanism is related to enhanced cost-recovery from government agencies. For example, Australian Defence Force deployments pose a biosecurity risk to Australia through the movement of contaminated vehicles, machinery, equipment and personal items providing a route for the entry of exotic pests and disease.

Efficiency

Our assessment is green for the efficiency criterion. Recovering biosecurity costs from other government agencies in line with the costs that they impose would lead to an improvement in allocative efficiency, by sending signals to impactors / risk creators about the risks / costs they impose.

Equity

Our assessment is green for the equity criterion as this would support government agencies being treated the same way as other risk creators where cost-recovery arrangements are in place.

Adequacy/dependability

Our assessment is green for the adequacy/dependability criterion as fees can be determined that fully recover relevant biosecurity costs and be regularly updated over time.

Simplicity

Our assessment is green for the simplicity criterion. As cost-recovery arrangements are already in place for some government agencies, it would be relatively simple to extend these to government agencies.

Other comments

While we have not assessed the feasibility of this mechanism it may be difficult to obtain inter-agency agreement on cost-recovery and/or the arrangements may conflict with other government objectives.

[23] Biosecurity Levy Steering Committee, *BIOSECURITY IMPORTS LEVY: A WAY FORWARD*, Report to the Minister for Agriculture, May 2019.

4.2.5 An increased passenger movement charge

There is an existing PMC of $60 per person, however, only a portion of the existing fee revenue is used to fund biosecurity services. There is no requirement for the PMC to fund biosecurity services and as such the PMC is considered a tax.

This mechanism would involve increasing the $60 fee above the $60 level, with the proceeds in excess of $60 to be used exclusively to fund biosecurity services.

Efficiency

Our assessment is green/amber for the efficiency criterion. It is difficult to assess whether an increase to the PMC would improve allocative efficiency, or if it would be more appropriate to allocate more of the existing fee revenue to biosecurity activities. In addition, we note that a flat PMC across all passengers, regardless of where they travel to or from may not reflect the biosecurity risks that they impose.

Equity

Our assessment is green for the equity criterion as this mechanism would treat all passengers the same, and ensure those who benefit from biosecurity activities, pay for it. Many passengers are tourists who visit Australia to enjoy our unique natural environment and are therefore beneficiaries of our biosecurity system.

Adequacy/dependability

Our assessment is green for the adequacy/dependability criterion. Assuming the increased PMC is used to fund biosecurity functions, the level of funding would be tied to the level of risk (i.e. number of passenger movements) and therefore, the costs.

Simplicity

Our assessment is green for the simplicity criterion. The PMC is already in place, relatively simple to understand and could be increased relatively easily.

Other comments

We understand that in order for the PMC to be a hypothecated tax, it would need to be directly linked to biosecurity services. Therefore, the PMC would need to change so that arriving passengers were charged rather than departing ones. There is likely to be strong opposition from the tourism industry for this proposal.

4.2.6 A revenue source from beneficiaries of the biosecurity system

Levies or charges on groups that are vulnerable to biosecurity hazards and benefit from biosecurity control are examples of revenue sources form biosecurity system beneficiaries. Another example of a revenue source from the beneficiaries of the biosecurity system are the Emergency Response Deeds established between Animal Health Australia and Plant Health Australia, the Australian Government, State and Territory Governments and all significant animal and plant industry sectors. These are our nation's largest formal government–industry biosecurity partnerships. The deeds include cost and responsibility sharing deeds for major exotic pests and diseases. There is no similar partnership approach with the import sector, for example.

The following assessment pertains to the establishment of funding deeds between Government and industry for ongoing biosecurity service cost-sharing in addition to the Emergency Response Deeds previously addressed (i.e. for industries not currently covered by such deeds).

Efficiency

Our assessment is green for the efficiency criterion. A funding deed with industry would send a pricing signal to beneficiaries of biosecurity regarding the benefits they receive from investment in biosecurity.

Equity

Our assessment is green for the equity criterion as broader industry funding deeds would ensure that other industry beneficiaries are treated the same (i.e. not just the plant and animal industries contributing to these costs)

Adequacy/dependability

Our assessment is green for the adequacy/dependability criterion as the funding provided through these deeds is generally designed to recover the total biosecurity costs, shared between industry and government.

Simplicity

Our assessment is amber for the simplicity criterion as while it would be relatively simple to leverage from existing funding deeds there would be significant complexity in developing and negotiating the terms of these funding agreements. There would also likely be complexity associated with the implementation and ongoing administration of these funding deeds given the industry-wide scale this mechanism would be implemented on.

4.2.7 Biosecurity risk insurance

Box 4 provides information on biosecurity risk insurance.

Box 4: Summary of biosecurity risk insurance

- Risk creators (e.g. importers and vessel operators) would be required (under legislation) to purchase biosecurity risk insurance from a government-run insurance agency.
- Biosecurity insurance would need to be compulsory (like third third-party motor vehicle insurance) on all inbound movement of goods and vessels and could be extended to inbound passengers. The premium would be based on the level of risk associated with the type and origin of imported good, or vessel — higher premiums for higher-risk imports/vessels.
- Biosecurity risk insurance premiums are determined by actuaries, using the same principles used to determine insurance premiums relevant to other classes of insurable risk.
- Importers/vessel operators (and potentially passengers) would pay premia based on the expected losses determined from the risk rating of the relevant import/vessel/ passenger. Higher-risk imports/vessels/passengers would pay higher insurance premia than low-risk imports.
- Biosecurity risk insurance premiums would be pooled by a government insurance agency.
- The pooled premia would fund:
  - biosecurity system costs (pre-border interventions) and
  - the cost of controlling outbreaks (post-border) of pests and diseases as they occur. Extreme biosecurity risks would continue to be regulated and prohibited as necessary.

Source: Centre of Excellence for Biosecurity Risk Analysis (CEBRA) and the Centre for Market Design (CMD), University of Melbourne submission to DAFF discussion paper, How do we make national biosecurity funding sustainable? 2022.

Efficiency

Our assessment is green for the efficiency criterion. This mechanism is designed to create incentives to align risk creator behaviour with biosecurity objectives and result in an efficient level of biosecurity activities. It also identifies the type of biosecurity effort needed based on the revenue (insurance premia) collected from different biosecurity threat pathways, thus supporting allocative efficiency.

Equity

Our assessment is green for the equity criterion. The design of biosecurity risk insurance results in those that create similar biosecurity threats paying similar premiums.

Adequacy/dependability

Our assessment is green for the adequacy/dependability criterion. By actuarially pricing risk, biosecurity risk insurance ensures that the pooled premia is sufficient to fund biosecurity system costs (i.e. left-hand side of the generalised invasion curve) and response losses as they arise. The revenue raised scales with Australia's exposure to biosecurity threats and volume of trade.

Simplicity

Our assessment is amber/red for the simplicity criterion. Biosecurity risk insurance is built on actuarial risk pricing and is relatively more complex than most other mechanisms assessed in this report.

The Australian Government would need to establish substantial governance and operational architecture to facilitate biosecurity risk insurance. This approach relies on a solid understanding of underlying biosecurity risks which may take further time and investment in information technology and data systems.

5 Conclusion

A sustainable funding approach is critical to delivering a strong biosecurity system, and therefore, protecting Australia's economy, environment and communities. Funding arrangements have the capacity to influence the incentives of parties with interests in biosecurity outcomes, and therefore the efficiency and effectiveness of the arrangements.

Our analysis of funding mechanisms has found:

1. A sustainable funding model for biosecurity will likely require a range of different funding mechanisms and identifying the best mix of mechanisms needs a co-ordinated and holistic approach.
2. The individual mechanisms assessed in this report against well-established taxation and funding principles may all have a role to play in a sustainable funding model, subject to more detailed assessment, including assessment of their feasibility.
3. There is a need to improve transparency around total biosecurity expenditure (and in-kind contributions) from industry, government and not-for-profits, as well as identifying biosecurity risk creators and beneficiaries.
4. From an economic perspective, the funding hierarchy for biosecurity requires that funding be first sought from risk creators/impactors, then beneficiaries, and finally, government. The mechanisms assessed in this report suggest there are opportunities to receive more funding from a range of relevant parties, including from biosecurity risk creators.

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