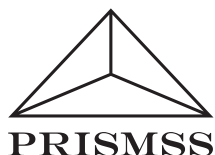




Pacific Invasive Species Battler Series



CREATE SUSTAINABLE FINANCING FOR INVASIVE SPECIES MANAGEMENT







**Pacific Invasive Species
Battler Series**

**CREATE SUSTAINABLE
FINANCING FOR INVASIVE
SPECIES MANAGEMENT**





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Cover photo: Biosecurity in practice at Faleolo International Airport, Samoa. Credit: Ministry of Agriculture and Fisheries, Samoa.



Secretariat of the Pacific Regional Environment Programme (SPREP)

PO Box 240
Apia, Samoa
T: +685 21929
E: sprep@sprep.org
W: www.sprep.org



Our vision: A resilient Pacific environment sustaining our livelihoods and natural heritage in harmony with our cultures

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Dear Invasive Species Battler,

We are a diverse bunch of people in the Pacific region, which spans about one third of the earth's surface and encompasses about half of the global sea surface. We have ~2,000 different languages and ~30,000 islands. The Pacific is so diverse that its ecosystems make up one of the world's biodiversity hotspots, with a large number of species found only in the Pacific and nowhere else. In fact, there are 2,189 single-country endemic species recorded to date. Of these species, 5.8 per cent are already extinct or exist only in captivity. A further 45 per cent are at risk of extinction. We face some of the highest extinction rates in the world.

The largest cause of extinction of single-country endemic species in the Pacific is the impact of invasive species. Invasives also severely impact our economies, ability to trade, sustainable development, health, ecosystem services, and the resilience of our ecosystems to respond to natural disasters.

Fortunately, we can do something about it.

Even in our diverse region, we share many things in common. We are island people, we are self-reliant, and we rely heavily on our environment to support our livelihoods. We also share many common invasive species issues as we are ultimately connected. Sharing what we learn regionally makes us and our families benefit economically, culturally, and in our daily lives.

The "Invasive Species Battler" series has been developed to share what we have learned about common invasive species issues in the region. They are not intended to cover each issue in depth but to provide information and case-studies that can assist you to make a decision about what to do next or where to go for further information.

The SPREP Invasive Species Team aims to provide technical, institutional, and financial support to regional invasive species programmes in coordination with other regional bodies. We coordinate the [Pacific Regional Invasive Species Management Support Service \(PRISMSS\)](#), the [Pacific Invasive Learning Network \(PILN\)](#), a network for invasive species practitioners battling invasive species in Pacific countries and territories, and the [Pacific Invasives Partnership \(PIP\)](#), the umbrella regional coordinating body for agencies working on invasive species in more than one Pacific country.

For knowledge resources, please visit the Pacific Battler Resource Base on the SPREP website: <https://brb.sprep.org/>

Thank you for your efforts,

SPREP Invasive Species Team



About This Guide

This Battler Series publication supports national managers in ensuring access to sustainable sources of financing for the management of invasive species. This guide provides insight into the process of planning sustainable financial flows and example mechanisms for the Pacific island context, specifically directed at those raising funds for long-term management. The publication draws on a larger body of research conducted by a team of experts: Sean Weaver (Ekos), Lucie Greenwood (The Connective), Mary Anne Teariki (Independent Researcher), and Ian Short (The Connective).

What is Sustainable Financing?

Sustainable financing is about gaining access to funding in a way that can continue permanently for all the work that needs to be done and, typically, that does not rely on grants.

Those involved in conservation or environmental management know how important funding is and how much effort is involved in getting the funding needed for projects and activities. The task of getting money is usually the role of the director or manager of an organisation. In the case of government departments, this responsibility typically lies with the finance manager.

Conservation organisations are usually funded by membership fees or grants for core administrative activities combined with grant funding for specific projects. Projects have a limited timeframe, so continuing with new projects means continually having to search for grant funding. Often these organisations also have to continually find sources of money for their core administrative activities.

If we think of money for invasive species management like a tank of water, money flows in through a revenue pipe and accumulates in the main tank. From the main tank, other pipes flow out to other tanks representing the allocation of money for specific activities or projects.

There are three key features of this money flow:

- 1 revenue stream:** how much money is coming in over a period of time;
- 2 revenue source(s):** where the money is coming from;
- 3 capital investment:** the money required to set up to do the work, often involving purchases of physical infrastructure and staff training.

The money flowing in to fund day-to-day operations is a programme's revenue stream. If the revenue stream for the management of invasive species is a government grant or donor grant, the revenue source is taxation. By contrast, the revenue stream to fund the operation of a farm is the revenue from the sale of farm produce, and the revenue source is private consumers and their earnings from their jobs.

For the management of invasive species, there is a need for money to build the organisation that can do the job and get it started. The money to set up an organisation is called capital investment. This is the money to pay people to establish the organisation, buy the necessary equipment like computers and pest-control gear, recruit and train staff, and set up any projects.

Effective, long-term invasive species management cannot be achieved without access to sustainable financing. While many Pacific countries and agencies have been successful in securing grants from regional and overseas donors and a range of international organisations, our current pattern is one of applying and hoping for access to finance.

As noted in other Battler Series publications, the management of invasive species is not a one-off event but requires on-going determination and commitment from Pacific governments through to communities. Pre-invasion prevention is always cheaper than post-invasion control, but financing is required in either case.

This Battler guide focuses on potential ways that Pacific managers can secure sustainable forms of financing for greater certainty about the future of invasive species prevention and control. Sustainable financing may also provide greater independence in defining the project priorities and may cover opportunity costs (see 'Cost categories' on p. 9).

This publication is geared to a wide audience. This audience includes those working in your Finance Departments, within the private sector, and in communities who may wish to avail themselves of new ways of attaining sustainable finance for the management of invasive species.

1 Sustainable Revenue Streams

When we consider grant funding revenue streams, the flow of revenue can be constantly disrupted as grants are secured and then used up. These interruptions (combined with changes in donor priorities and requirements) can disrupt the effective management of invasive species control activities which, in turn, can diminish biodiversity conservation outcomes.

There is also the issue of how much money is available from the revenue stream and whether there is enough to fund the needs of a community to manage invasive species. When considering government funding or donor funding for invasive species control, a useful question to ask is whether taxpayers can afford to provide all the money needed for this work. Often the answer may be 'yes' but only if less money is allocated to other sectors, such as health care, education, or road repairs. These competing interests form the basis for the use of taxpayers' money. This is the political reality behind government funding and donor funding. In the politics of allocating taxpayers' money for conservation, other users of government money often make a stronger case for funding and win the political competition for money allocations.

But imagine getting a revenue stream that never dries up. In our water tank analogy, the main tank can be constantly topped up and the outflows to activities can be constantly flowing. This is what a sustainable revenue stream would be like. If taxpayers cannot afford to be the source of all this revenue, we need to look for other sources to either replace taxpayers' money or add to it.

For example, the revenue stream to produce this edition of the Battler Series was the Global Environment Facility (GEF), and the revenue source was taxpayers from different donor countries that contribute to the GEF. This edition of the Battler Series is an example of using taxpayers' money in the form of a grant to fund a search for alternative revenue streams and sources of revenue for invasive species control.



Definition of Sustainable Financing

Financial resources that are secure and stable, predictable, and sufficient to cover the full costs of effective delivery of a programme's intended outcomes over the long term.

An activity that is financially sustainable is financially self-sufficient and independently generates enough revenue to cover all of its expenses. Typically, sustainable finance is sourced from revenue streams that do not have fixed end dates, in direct contrast to time-bound project finance.

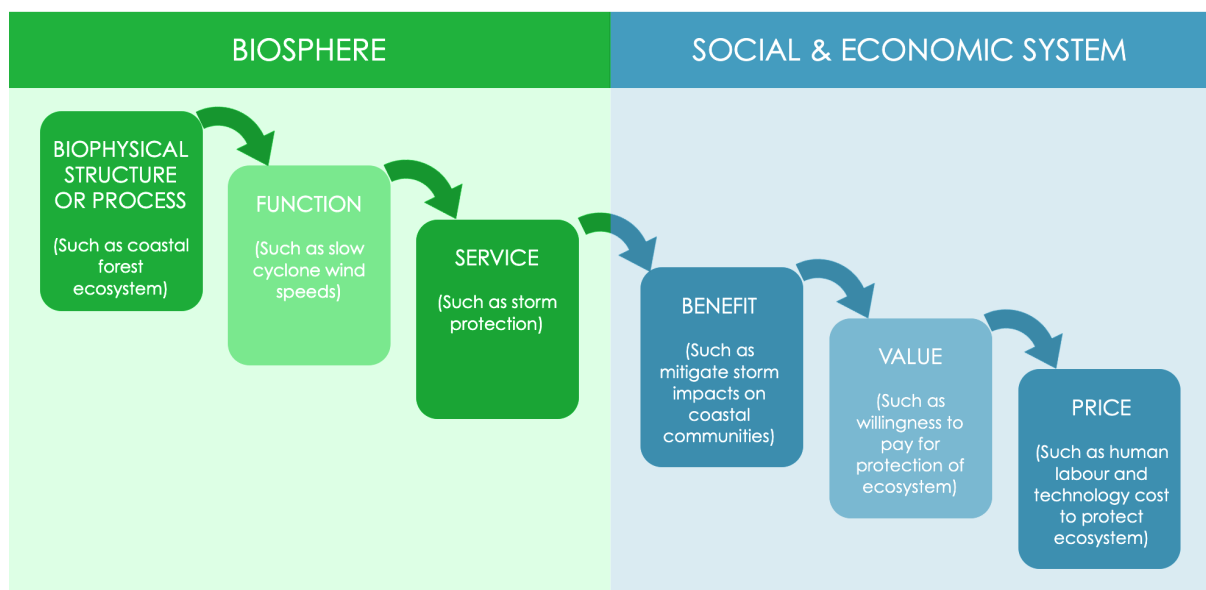
1.1 Translating Ecosystem Services into Priceable Actions

Ecosystem services are some of the benefits delivered by natural ecosystems. These services include provisioning services like food, wood, spices, fibre, water, raw materials, and medicines; supporting services like nutrient cycling, soil formation, and habitats; regulating services like erosion control, storm surge protection, flood protection, air and water purification, detoxification, biological control of pests and weeds, and pollination; and cultural services like cultural symbols and heritage, recreation, tourism, scenic beauty, and aspects of science and education.

When viewed with an ecosystem services lens, ecosystems can be understood as the natural or ecological infrastructure that provides many benefits. Many people who are not trained in ecology already understand how infrastructure provides benefits to society – things like roads, telecommunication systems, electricity distribution, bridges, and buildings. Similarly, it is easy to understand part of the value of natural ecosystems when we understand that the beneficial services that ecosystems provide will decline if the ecosystem degrades.

Some of these values can be translated into economic prices or units that can be assigned a specific monetary price. In this way, we can see how ecosystem functions become beneficial ecosystem services that cross over from the biophysical to the social and economic world (Figure 3.1).

Figure 3.1: Ecosystem services cascade.



1.2 Assessing the Cost of Managing Invasive Species

Any process of sustainable financing should begin with an accurate assessment of the real costs involved.

When ecosystems are imagined as ecological infrastructure, it can become easier to think about the benefits and costs of ecosystem management and to justify this cost to people who are not trained in conservation or ecology. Generally, people understand that if we do not spend money maintaining the roads, the roads will degrade, and the benefits of road transport will decline. The same kind of thing happens to ecosystems when invasive species thrive and damage those ecosystems, reducing the supply of provisioning, supporting, regulating, and cultural services delivered for free by nature. Just as maintaining roads requires money that is justified with an efficient budget (so that money is not wasted on unnecessary things), invasive species control requires an efficient and effective budget.

While it is important to exclude unnecessary activities in a budget (this delivers efficiency), it is also important that all necessary activities are included (this delivers effectiveness).

The process of defining an efficient and effective budget for invasive species control can be greatly helped by undertaking the following steps:

- 1 identifying the measurable outcomes that the invasive species control effort aims to deliver;
- 2 determining the outputs (results of activities) that will cause these outcomes;
- 3 defining the activities that will deliver these outputs; and
- 4 calculating the budget for each of the activities.

This can be illustrated with an intervention logic model (also called a log-frame).



Managing invasive species makes economic sense

Between 1960 and 2020, the costs of damage caused by invasive species worldwide reached at least USD 1,131 billion, more than 12 times the amount spent on invasive species management. Even though management actions are considered to be under-funded, the damage costs would have exceeded USD 3,424 billion if no management action had been taken. Every USD 1 of management was estimated to reduce damages by about USD 54.

Pre-invasion spending was 25 times lower than post-invasion spending, despite the economic benefits of preventive action. Only a fraction of the USD 95.3 billion spent on invasive species management went towards proactive prevention measures. Most (USD 73 billion) was spent on control or eradication measures when damage was already underway.

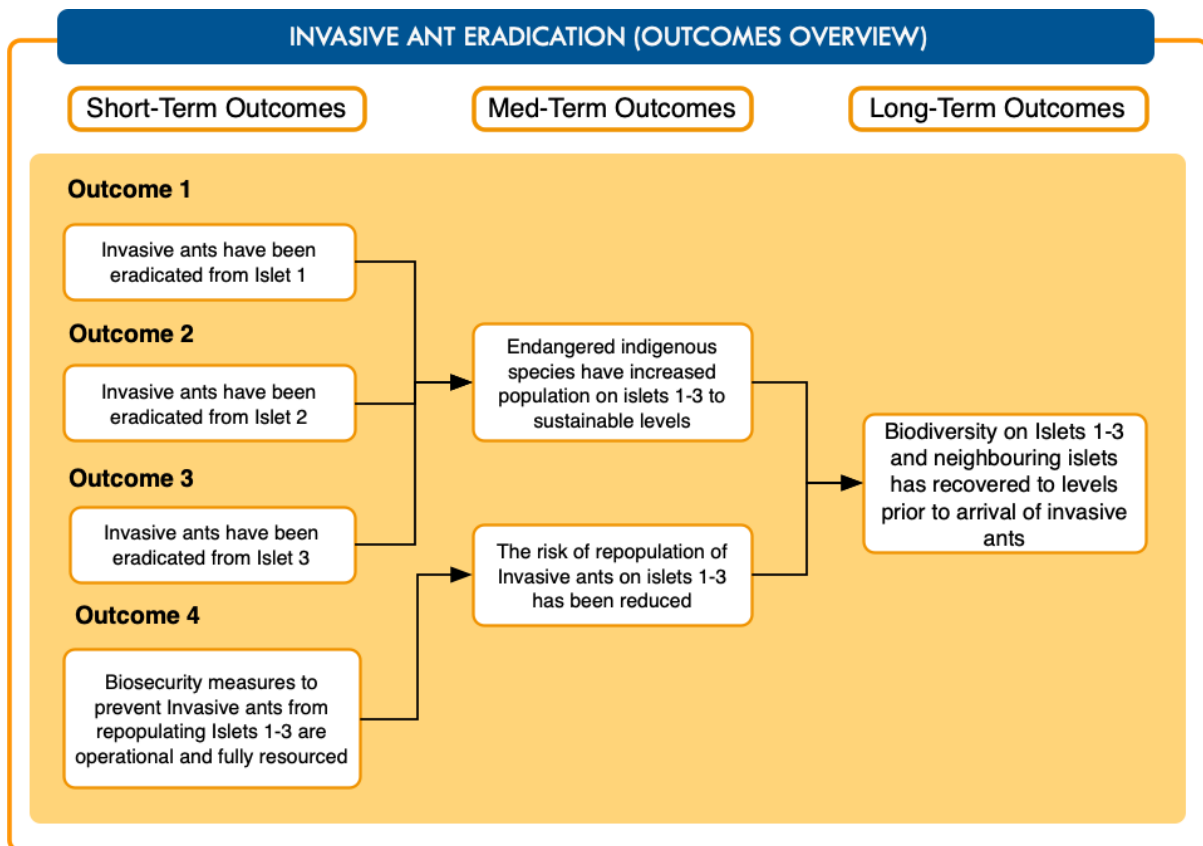
The Battler guide *Use Economic Analysis to Battle Invasive Species* can help you calculate and justify the costs of invasive species management. For more about the benefits of early action, see the Battler guide *Catch it Early: Invasive species early detection and rapid response*.

Data source: Cuthbert et al. (2022)

1.2.1 Defining outcomes

Invasive species management projects and activities typically want to cause a different future than what would happen without this management. We define outcomes by defining that desired future condition. Such outcomes are those that are directly caused by the management activities and those that are indirectly enabled by invasive species management. Outcomes can also be short-term, medium-term (caused by short-term outcomes), and long-term (caused by medium-term outcomes of this and other projects). For an imaginary example, see Figure 3.2.1.

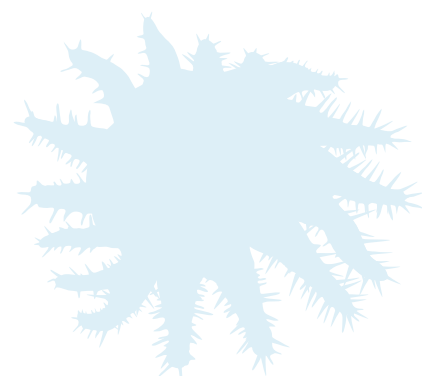
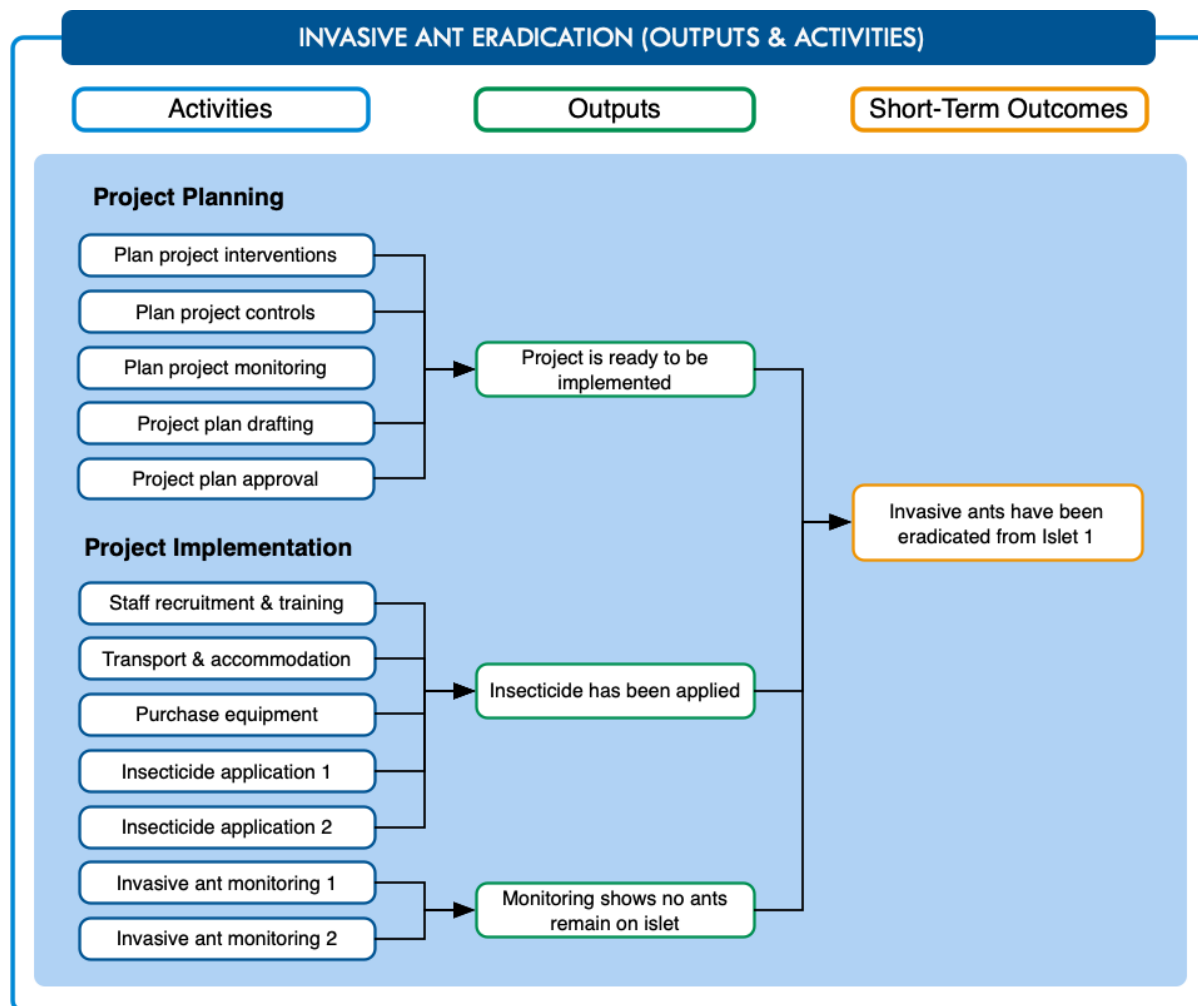
Figure 3.2.1: Example of short, medium, and long-term outcomes in a hypothetical project.



1.2.2 Defining outputs and activities

Project outputs directly cause each short-term outcome. Project activities cause each project output and are used to calculate the project budget. For an imaginary example, see Figure 3.2.2.

Figure 3.2.2: Hypothetical example of project activities and outputs.



1.2.3 Reactive and proactive projects

From a financial perspective, solutions can be either reactive or proactive.

Reactive solutions pay for a solution to a problem that has already occurred. Eradicating an introduced species is an example of a reactive project. A common metaphor for reactive actions is 'providing ambulances at the bottom of the cliff.'

Proactive solutions pay to prevent a problem from occurring. Biosecurity measures are a good example of prevention measures. A common metaphor for proactive actions is 'building fences at the top of cliffs.'

1.2.4 Cost categories

Solutions can be broken down into three cost categories:

- 1 Capital Expenditure** is the money spent creating/establishing a conservation area and/or project, including the initial purchase of physical resources. Example: Invasive species management programme buying a boat to transport staff to remote island sites.
- 2 Operating Expenditure** is the money spent operating and maintaining the conservation area and/or project. Example: Invasive species management programme operating the boat with staff and fuel.
- 3 Opportunity Cost** is the money or other resource that people have to give up to enable them to achieve a conservation outcome. Example: A landowner giving up revenue from wood sales from their forest if they instead place the forest into a reserve and eradicate invasive species from that reserve.

Opportunity costs are one of the more difficult costs to cover in conservation projects. Grant funding will often not provide funds to cover opportunity costs, mainly because these can be high and they can go for a long period of time (sometimes indefinitely).

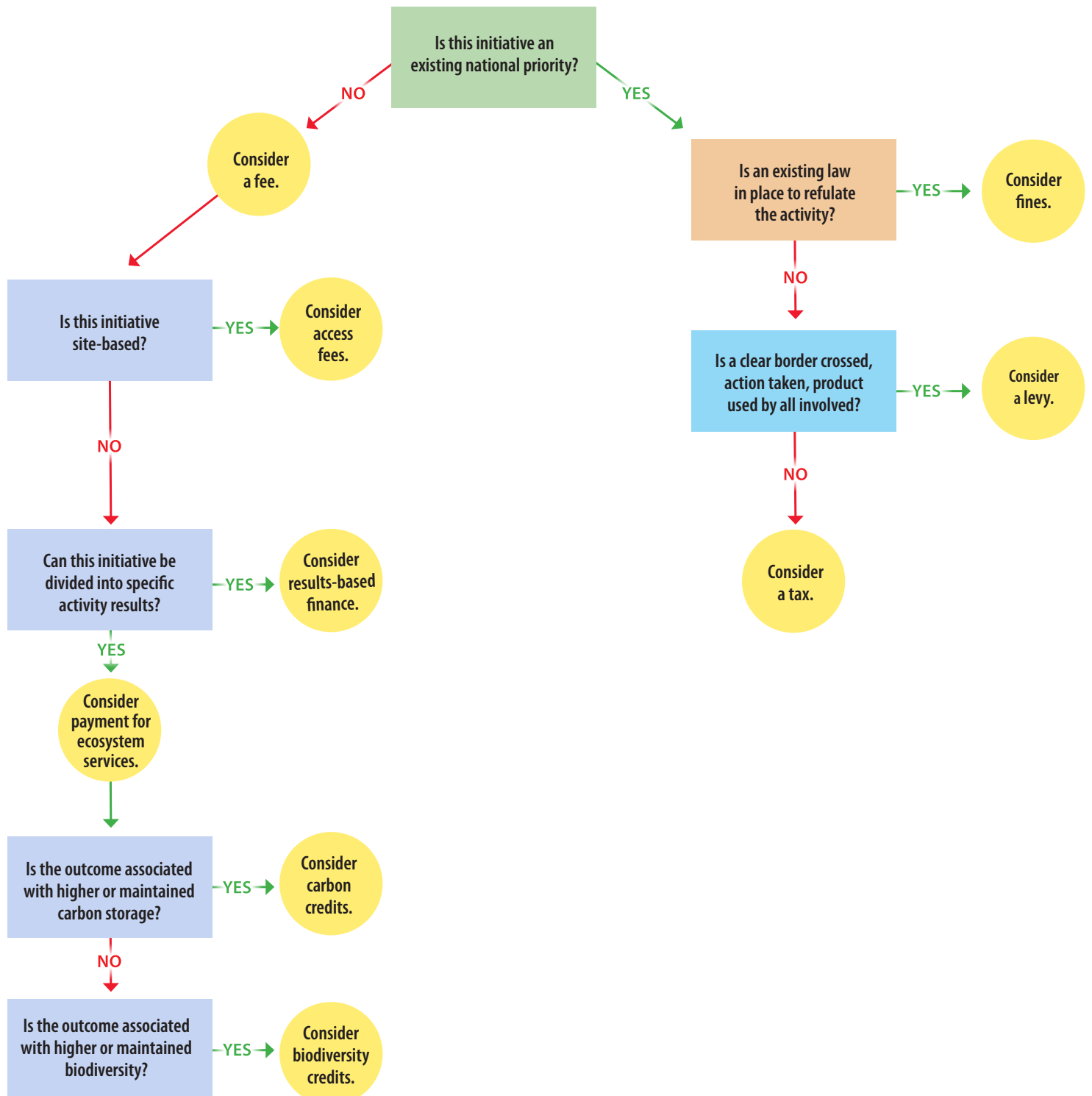
If these three cost elements are not financed, then the protection of ecosystems and prevention of biodiversity loss will not be achieved.



Coconut rhinoceros beetle infestation in the Pacific islands could cost the region USD 169 million each year by 2040 if the pest invasion is not curbed. Since its discovery in Guam, the CRB-G strain has been confirmed in Hawaii, Papua New Guinea, Solomon Islands, Northern Marianas, and New Caledonia. Long-term management rather than one-off projects are needed to address such widespread risks. Photo: SPC/Matilda Simmons

Flowchart: How can I decide what revenue stream to consider?

Multiple categories of sustainable revenue streams may be appropriate for a given project. Use the following flowchart to guide your investigation.



2 Categories of Sustainable Revenue Streams

There are several different options for sustainable revenue streams, each with their advantages and disadvantages. Some are more compatible with sustainable financing than others (see *Sustainable Finance for Invasive Species Management in the Pacific*).

2.1 Taxes and Levies

Taxes are compulsory payments imposed on individuals and businesses by government for the government to spend on 'public goods', for the benefit or wellbeing of the public.

Levies are compulsory payments, such as taxes, tariffs, or other charges, imposed on individuals and businesses by government for the purpose of covering costs, such as environmental protection. Levies are associated with a specific action or product.

Both taxes and levies can be collected from foreign individuals and companies operating in the country.

2.1.1 Examples of levies used in the Pacific

- 1 Border Clearance Levies:** used to recover costs associated with biosecurity, such as the prevention and containment of invasive introduced species;
- 2 Environmental Levies:** imposed on visitors to support environmental protection programmes, including invasive species control;
- 3 Conservation Levies:** imposed on those entering conservation sites for their upkeep and protection;
- 4 Waste Management Levies:** charged and payable on specific goods and products (such as plastic bags and batteries) to reduce their use and to pay for their disposal;
- 5 Maritime Levies:** variety of levies imposed on maritime operators to cover activities and services, such as maritime biosecurity and protection of marine environments.

2.1.2 Issues to consider for taxes and levies

Fairness, transparency, and accountability are critical principles underlying the use of levies, whether they be for biosecurity cost-recovery or other uses. Levies need to relate to the true cost of delivering services and not for any other purpose. The costs of services need to be transparent to ensure that other costs are not being added to generate revenue. Their collection and their use need to be accounted and made public. Any review of levies needs to include public consultation, and any changes need to be based on these principles.

As a national mechanism, taxes can also be used to support disaster risk management and its implications for invasive species management. A key element of sustainability is creating a buffer so that one event does not bring about irreversible change. Even as priorities shift during emergencies, invasive species remain a threat during and following a disaster event, with even humanitarian aid bringing biosecurity risks (van den Burg et al. 2021).

2.1.3 Implementation of taxes and levies

Cost-recovery is about ensuring those who impose costs pay for them. For example, importers who bring goods into a country run the risk of unknowingly bringing invasive species into our islands. Levies allow governments to raise revenue to protect our borders and to deal with any issues that may emerge.

Levies are widely used in the Pacific to recover the costs of biosecurity. We outline some of the key steps you will need to consider for introducing a levy, using biosecurity as the example; these steps are broadly applicable to any levy for invasive species management.

Key Steps for Implementing Biosecurity Levies for Cost-Recovery:

- 1 Government seeks advice from a government department about the use of levies for biosecurity cost-recovery.
- 2 Identify biosecurity costs and who would bear the costs of any levies, reported to Ministers.
- 3 Develop a 'White Paper'. This is a document that can be used for consultation with potential affected groups, such as industry groups.
- 4 Report back to Ministers on the results of the consultation.
- 5 Develop a policy paper for ministerial agreement for the use of levies, identifying costs to be recovered, instructions for legislation, and the formation of a regulatory authority to set levies.
- 6 Pass legislation setting out, among other things, the start date for the collection of levies and the time period for review (usually 3 to 5 years).
- 7 Gazette the level of levies before enforcement. Gazetting allows affected parties to raise concerns that may result in changes to the levies before implementation.

2.2 Fees

A **fee** is an amount of money that must be paid for a service. Fees can be charged by governments and their agencies to recover the cost of services. These costs have to be able to be quantified and efficiently recovered.

2.2.1 Examples of fees used in the Pacific

- 1 Charging for call-out of experts to deal with biosecurity issues at a specific site.
- 2 Use of fumigation at a particular site to eradicate an invasive species that may have crossed the border.
- 3 Inspection of vessels for safety.

Fees are useful in making those who create risk paying for the management of those risks. For example, if some imported goods are found to have associated invasive species, then bringing in experts to deal with that is paid for by the importer rather than the taxpayer.

2.2.2 Issues to consider for the use of fees

In the case of government fees, fees are not about raising revenue but rather about recovering the costs associated with expert identification, the management of invasive species at the border, and managing risks that may arise that requires people and businesses to keep up with standards.

As with taxes and levies, such fees are implemented through policy and the passing of legislation that allows fees to be collected. Fees need to be fair, transparent, and accountable.

Fees can also be charged for entry to activity centres or areas, such as conservation areas. Such fees can be charged by non-governmental organisations, local landowner communities, or private entities that have a role in owning and/or managing such sites.

2.2.3 Implementation of fees

Key Steps for Implementing Government Fees:

- 1 Government seeks advice from a government department about the use of fees for biosecurity cost-recovery.
- 2 Research biosecurity costs and who would bear the costs of any fees to Ministers.
- 3 Develop a 'White Paper', a document that can be used for consultation with potential affected groups, such as industry groups.
- 4 Report back to Ministers on the results of the consultation.
- 5 Develop a policy paper for ministerial agreement for the use of fees, identifying costs to be recovered, instructions for legislation and the formation of a regulatory authority to set levies.
- 6 Pass legislation setting out, among other things, the start date for the collection of fees and the time period for review (usually 3-5 years).
- 7 Gazette the levels of fees before enforcement. Gazetting allows affected parties to raise concerns that may result in changes to the levies before implementation.

Key Steps for Implementing Non-Government Fees:

- 1 Identify the legal entity that will charge the fees. This might be a community organisation such as a community conservation trust.
- 2 Identify or establish the governing body that will make decisions about fee collection and allocation.
- 3 Seek legal advice about the ability of this organisation to charge fees for entry/access to the area in question and any tax implications.
- 4 Develop a budget for the invasive species control and the portion of that budget that will be funded through entry fees, then set the entry fee as a unit price per person or group entering the area.
- 5 Establish a fee collection system and a plan to resource that fee collection system (such as assign a role for a person to be the fee collector and a place where visitors will enter the area and pay the fee).
- 6 Establish a revenue allocation system and governing arrangement for fee allocation to ensure that the fees collected are spent in the manner decided by the fee-collecting organisation.
- 7 Undertake periodic (such as quarterly or annual) governance meetings of the fee-collecting entity to review all fees collected and allocated as well as any taxation compliance requirements.

2.3 Fines

A **fine** is a penalty imposed on a person or business that breaks the law of a country. In the case of biosecurity, a biosecurity fine is a penalty imposed on those who break biosecurity laws.

2.3.1 Examples of fines used in the Pacific

- 1 Instant fines imposed on those who break biosecurity laws, such as importing forbidden goods. In most cases, these are instant fines charged at the border (the airport or port).
- 2 Fines that result from court proceedings for significant breaches of biosecurity laws.

2.3.2 Issues to consider for the use of fines

Fines have an important role to play in ensuring that people abide by the law, such as biosecurity. Fines send an important message that those who break such laws will face penalties. As such, fines are not about raising revenue for the management of invasive species but more about changing the behaviour of people in the knowledge that they face consequences if they break the law.

The use of fines requires a monitoring and enforcement system, with its own requirements for staffing, resourcing, and management.

2.3.3 Implementation of fines

Key Steps for Implementing Fines:

- 1 Government seeks advice from a government department about the implementation of fines related to breaches of laws.
- 2 Research the types and nature of fines to be used.
- 3 Consult industry groups or any affected parties, such as tourism industry and importers.
- 4 Report back to Ministers on the results of the consultation.
- 5 Pass legislation and develop regulatory authority for the collection of fines, including types of penalties for different types of breaches of relevant laws.
- 6 Gazette fines schedule to be implemented.
- 7 Set and inform public of start dates for fines, including review period.

2.4 Results-Based Payments

Results-based payments are a form of *ex post* financing or money paid after you have achieved a result.

This type of financing is a new way of giving out aid and funding of public services. Under this method, funding is delivered based on pre-agreed measured outcomes. Payment is provided on the basis of the delivery of measured and reported outcomes by a provider.

Such financing places the risk on those who provide or supply particular outcomes, thereby reducing the risks to the funder of outcomes not being delivered. If a project has to deliver first and then people are paid, this is opposite to grant funding where financing allows a project to start while paying people to conduct the project activities.

Results-based financing creates a cash-flow challenge for those undertaking projects or supplying services because they may need to borrow funds to deliver the first part of outcomes to receive the first part of their results-based payments.

2.4.1 Requirements for the use of results-based financing

Results-based financing requires that:

- 1 results are defined in advance,
- 2 those providing the service are free to design the ways by which those results will be achieved, and
- 3 payment is released based on the delivery of measured and reported outcomes by those providing the service.

An example of this in invasive species management would be those working to manage invasive species waiting to receive payment until they are able to show certain outcomes, such as the elimination of an invasive species from an island, no further biodiversity loss, or stronger ecosystems.

2.4.2 Issues to consider for results-based financing

Results-based financing requires careful consideration. Although it seeks greater transparency between the funders and those supplying a service about what is expected to be achieved, it can reduce innovation because the focus is more on the 'safety' of achieving particular results. It can also reduce the participation of smaller groups, such as community groups and non-governmental organisations, from being service providers due to the time, expertise, and financial expense required first to tender and then deliver on impact transparency and reporting.

These problems can be managed through specific approaches:

- 1 Outcomes are identified with communities to ensure they deliver what is locally needed.
- 2 Results frameworks are based on accountability and learning.
- 3 Outcomes are broad enough and long-term to provide space for innovation to see what works.
- 4 Local smaller-scale service providers are involved where possible.

Results-based financing is not designed to be forever. It is designed to last for the time of medium-term projects, roughly five to seven years. This means that results-based financing would not, at least not by itself, be appropriate for invasive species activities, such as biosecurity and management activities that are on-going.

2.4.3 Implementation of results-based financing

Key Steps for Implementing Results-Based Payments:

- 1 Develop a plan for a results-based payment system that identifies the:
 - target outcome to be funded,
 - target 'buyer' who has a mandate to seek the targeted outcome. The buyer could be a donor who wants to move away from high-risk or low-risk grant funding and is willing to do so on an on-going basis,
 - measurement, reporting, and verification system, and
 - financial transactions protocols.
- 2 Approach the target 'buyer' with a proposal and proceed to negotiations.

2.5 Payment for Ecosystem Services

Payments for ecosystem services (PES) are payments that focus on the delivery of ecosystem services. Such payments are often (but not exclusively) delivered an *ex post* payment arrangement (payment after you have achieved a result).

PES is often used as an umbrella term for the entire range of market-based instruments that generate payments for the conservation of ecosystem services, including, for example, carbon markets and biodiversity markets.

2.5.1 Ecosystem services

Guided by the United Nations Millennium Ecosystem Assessment, ecosystem services are divided into four main types:

- 1 **Supporting services:** the underlying natural processes, such as photosynthesis, nutrient cycling, the creation of soils, and the water cycle, that support life;
- 2 **Provisioning services:** benefits that nature provides to meet our core human needs, such as oxygen, nutritious food, health, and shelter, as well as resources traded in economic systems;
- 3 **Regulating services:** ecosystem processes essential for the on-going sustainability of ecosystems, such as maintaining air quality, regulating climate, and pollinating crops; and
- 4 **Cultural services:** non-material benefits that people obtain from ecosystems, such as sacred places or species, cultural identity, aesthetic pleasure, and so on.

Each of these ecosystem service types are linked to the Millennium Ecosystem Assessment categories of human wellbeing: security, basic material for good life, health, good social relations, and freedom of choice and action.

2.5.2 How payment for ecosystem services works

PES is defined in its original sense as arrangements that deliver a continuous series of payments to landowners, members of a community, and/or conservation organisations in exchange for them taking responsibility to manage ecosystems in a specified area to enhance ecosystem service delivery.

Frequently, the buyers of PES are the direct beneficiaries of ecosystem services, for example, tribal or community members or private owners of land.

The underlying thinking for PES is that if ecological infrastructure is degraded, its ability to deliver useful ecosystem services (and consequent human wellbeing outcomes) will also degrade. As we all know, environmental management of ecosystems comes at a cost: if these costs can be met through a PES payment system, then the ecological infrastructure can be protected and enhanced.

These payments are typically made after the outcomes have been delivered. However, there are no firm rules about when payments must be made or what payments must be for.

PES schemes can be designed by sellers and buyers with some level of flexibility. For example, upfront payments can be made to support the initial implementation of a PES project, or payments can be made for activities that are indirectly linked to the delivery of ecosystem services, such as education programmes to raise awareness of invasive species and their impacts.

If payments are received only after the outcomes have been delivered, it is important for a PES project to obtain additional funding such as external grant funding or investment to cover the costs of setting up the project and surviving to the first PES payment. If the funding is an investment, such as a loan, it will need to be paid back, often with interest. The payments for ecosystem services will, therefore, need to be priced to include the cost of debt repayment.

Types of ecosystem services targeted by PES

Carbon sequestration: The conservation and/or regeneration of forests, mangroves, seagrass beds, and other ecosystems can remove significant amounts of carbon dioxide from the atmosphere. PES focused on carbon sequestration may choose to generate revenue on carbon markets by confirming the amount of carbon sequestered and generating carbon credits. There are numerous examples in the Pacific of PES schemes being used to preserve precious forests in the fight against climate change.

Biodiversity: PES schemes to enhance biodiversity are related to several ecosystem services, such as food provisioning, water purification, genetic resources, and climate regulation to improve biodiversity outcomes.

Watershed protection: A common type of PES scheme globally, these schemes involve paying upstream landowners to maintain or change land use to ensure the availability and/or quality of the downstream water resource.

Marine-related ecosystem services: PES schemes can be used to preserve marine ecosystem services, such as pollution control, storm protection, flood protection, habitat for species, and shoreline stabilisation. It is important to note that marine ecosystems have impressive carbon sequestration capabilities (up to 50 times that of on-land ecosystems).

2.5.3 Issues to consider for the use of PES

The effort involved in developing a PES project typically requires partnerships between local members and service providers with experience in PES projects. As a starting point, it is vital that well-defined geographic boundaries are identified and that there is clear understanding between buyers and sellers of the proposed activity and expected outcomes. It is also imperative to have well-functioning governance structures put in place for local decision making. Given the difficulties of putting in place the components of PES, partnerships between local communities and external experts may need to be developed.

2.5.4 Implementation of PES

Key Steps for Implementing Payment for Ecosystem Services (PES):

- 1 Seek grant funding to undertake a high-level scoping study to evaluate potential for PES project development in the proposed natural area.
- 2 Identify potential sellers (interested in delivering ecosystem services in the proposed natural area) and buyers (interested in buying the ecosystem services generated).
- 3 Identify potential source of project development funding (either grant or investment).
- 4 Agree baseline of the natural area to be protected and/or regenerated and project parameters with PES buyer/funder entity. The baseline acts as a reference for future monitoring of the contractual obligations of the service provider in preserving natural areas.
- 5 Design project and measurement, reporting, and verification protocols in communication with buyer/funder entities.
- 6 Undertake project development/establishment for the identified natural area.
- 7 Implement project.
- 8 Verify periodic project monitoring reports (verified by buyer/funder entity or a third party).
- 9 Receive PES sales revenues.
- 10 Disburse revenues according to benefit-sharing plan and associated agreements.



Handover of equipment for monitoring the Mt Talau high-priority site. Equipment often forms part of the capital investment required to start invasive species management. Photo: Ministry of Meteorology, Energy, Information, Disaster Management, Environment, Climate Change and Communications, Kingdom of Tonga

2.6 Carbon Markets

Carbon markets refer to the production and sale of carbon credits that deliver carbon benefits to the atmosphere. They are a method of trading carbon credits. Carbon credit projects include activities involving nature conservation where the control of invasive species is potentially relevant. An example is a native forest restoration project that includes the control of invasive plants from an area.

Anthropogenic carbon emissions are a key driver of climate change, which joins invasive species to form the top two threats to Pacific island species according to the IUCN Red List. Led under the United Nations Framework Convention on Climate Change, the global community has made commitments to reduce carbon emissions as a global strategy to counter climate change.

As part of the global movement to reduce carbon dioxide concentrations in the atmosphere, carbon markets have been developed to support projects that reduce carbon emissions or increase carbon sequestration. Many organisations, events, and producers seek to reduce their impact on carbon emissions by voluntarily measuring and reducing their carbon pollution. Some then seek to compensate for the carbon emissions they could not reduce (because such emissions are impossible or prohibitively expensive to reduce) by offsetting these residual emissions and thereby minimise their net negative impact on the atmosphere. Offsetting these emissions involves purchasing carbon credits, sometimes from projects that deliver nature conservation outcomes. Nature conservation projects (including some in the Pacific) capture carbon and are awarded credits based on the volume captured, that is, the measured amount of carbon benefits they are delivering to the atmosphere. Credits can then be sold in carbon markets to fund the conservation project.

There are numerous examples of projects relating to the protection of forests in our region, but carbon markets could also have an important role in relation to the management of invasive species. For example, invasive species threaten the health and survival of native forests and other ecosystems of critical importance for carbon storage. Some invasive species prevent ecosystems from delivering carbon benefits to the atmosphere (such as invasive herbaceous vines that smother woody vegetation). Controlling such species can, therefore, enable additional carbon benefits to the atmosphere to be delivered.

Measuring the carbon benefits of such invasive species management is one way of creating carbon credits. In other situations, a carbon project that is not harmed directly by invasive species may elect to include invasive species management in its management plan. This will increase the non-carbon co-benefits of the project and enhance its appeal to carbon buyers seeking to support projects that deliver multiple benefits.

Not every carbon project will be an invasive species management project, but there are mutual benefits to developing projects with relevant invasive species management activities.

There are two types of carbon markets:

- **Regulated carbon markets** have mandatory obligations for reduced carbon emissions imposed by countries and by regional and international agreements.
- **Voluntary carbon markets**, which trade in carbon reduction but are outside official and mandatory requirements.

Here, we focus on **voluntary carbon markets** where landowners and local communities can decide to protect their natural resources and vital ecosystems to avoid or counter carbon emissions and earn an income in doing so.

2.6.1 Some project types for carbon markets

Multiple project types in many different ecosystems can effectively avoid greenhouse gas emissions or boost carbon storage. These projects can generally be divided into those that prevent carbon emissions through conservation and/or sustainable management and those that increase carbon sequestration, such as ecosystem restoration or enhancement.

For example, in forests, projects can undertake reforestation (carbon is taken out of the atmosphere and stored in a forest); improved forest management (enhancing carbon sequestration and/or reducing emissions from a forest ecosystem); or avoided deforestation (avoiding emissions by permanently changing land use from a forest to a non-forest system).

Other approaches potentially relevant to invasive species control in the nature-based solutions carbon sector include grassland management, regenerative agriculture, wetland conservation and/or restoration, and 'blue carbon' projects such as the conservation and/or restoration of mangroves, seagrasses, salt marshes, and coral reefs.

An example of a **direct** activity type most relevant to invasive species on land is 'improved forest management' where the control of invasive herbaceous vines (such as *Merremia peltata*) could be used to enhance the regeneration of natural forests and where *Merremia* control is shown to increase the rate of carbon sequestration into woody species. It is well understood that liana vines can reduce carbon accumulation and storage in tropical forests (van der Heijden et al. 2015).

Examples of **indirect** activity types relevant to invasive species control may include all the above and others including agricultural projects and grassland projects.

While invasive species management may only contribute a minor component of the direct carbon benefits in such projects, the management of invasive species can form a major component of project management plans funded by the carbon credits cash flows.

2.6.2 Examples of indigenous forest carbon projects in the Pacific

- Drawa Forest Carbon Project – Fiji
- Loru Forest Carbon Project – Vanuatu
- Babatana Forest Carbon Project – Solomon Islands
- NIHT Topaiyo REDD+ Project – Papua New Guinea

There are other indigenous forest carbon projects under development in our region. Their success reflects the desire of communities to protect their precious natural forest ecosystems while at the same time being able to earn an income for their sustainable development.

2.6.3 Standards for carbon projects

Multiple standards exist for carbon projects. Some of these standards are solely focused on carbon benefits whereas other standards also consider aspects such as fair trade, community wellbeing, or biodiversity. The international carbon standard used for the above projects in the Pacific are the Plan Vivo Standard (Drawa, Loru, and Babatana forest carbon projects) and the Verified Carbon Standard (NIHT Topaiyo REDD+ Project).

- The **Plan Vivo** standard has community and biodiversity requirements as a core element.
- The **Verified Carbon Standard** has a co-benefit standard for nature-based solution projects in the form of the Climate Community and Biodiversity (CCB) standard.

2.6.4 Implementation of carbon projects

Key Steps for Implementing Carbon Projects:

- 1 Seek grand funding to undertake:
 - a high-level scoping study to evaluate the potential for carbon project development (forests, agriculture, blue carbon). **Outcome:** short list of possible pilot projects.
 - up to three pilot project scoping studies. **Outcome:** readiness to seek project development funding to undertake pilot projects.
- 2 Conduct a detailed scoping study for each pilot project. **Outcome:** investment readiness for viable pilot projects. Ability to register project with carbon standard.
- 3 Assign project developer to coordinate and manage project development activities.
- 4 Determine a preferred sustainable financing modality (type of investment) to fund project development. There are a number of sustainable financing types, such as grants combined with investment. **Outcome:** investment strategy.
- 5 Design capital structure for investment option.
- 6 Undertake fundraising.
- 7 Undertake project development.
- 8 Validate Project Description (containing project business and management plans).
- 9 Implement and monitor project.
- 10 Verify periodic project monitoring reports.
- 11 Issue carbon credits.
- 12 Monetise carbon credits through a carbon credit reseller.
- 13 Disburse revenues according to benefit-sharing plan and associated agreements (including debt servicing).

2.7 Biodiversity Markets

Biodiversity credits are like carbon credits but where the focus is the delivery of biodiversity benefit rather than a carbon credit.

While biodiversity credits are a market instrument, the biodiversity credit market is far less developed than the carbon market.

An example of a biodiversity market buyer may be a company that seeks to undertake 'corporate social responsibility'. In our region, this could include businesses with an interest in linking their brand with biodiversity conservation (such as hotels, tourism operators, or airlines) or businesses located in donor countries that may have supply chains in Pacific islands.

Like carbon market projects, projects that produce biodiversity credits can be fully funded for the project period without any need for grants or where grant funding plays a co-financing role.

2.7.1 Understanding biodiversity credits

Biodiversity credits can be understood as a unit of biodiversity conservation that has been measured, reported, verified, and made available for purchase by those who want to cause that biodiversity conservation outcome.

A defined unit of biodiversity conservation can be traded, under this system. The aim is generally to deliver a net benefit or no net loss of natural habitats or biodiversity, as defined for the specific credit. Aspects of biodiversity offsets, particularly the concept of no net loss, remain controversial but are beyond the scope of the present document (see Buschke and Brownlie 2020).

2.7.2 Examples of biodiversity credits schemes

At the time of writing, the authors are not aware of any active biodiversity credit projects in the Pacific island countries and territories apart from the sale of 'habitat hectare' units from a forest conservation project in Vanuatu. Two biodiversity credit projects active in New Zealand are:

- 1 Rarakau Forest Carbon Project in Southland (biodiversity credits first transacted in 2014), and
- 2 the Sanctuary Mountain Maungatautari Biodiversity Credit project in the Waikato (project in development).

The biodiversity credit monetisation strategy (conversion to money) in these projects has been twofold:

- 1 Organisations, events, or products seeking to purchase biodiversity credits as part of an effort to support conservation initiatives. **Buyer motivation:** desire to contribute to financing the conservation of the ecosystem.
- 2 Voluntary carbon market buyers purchasing biodiversity credits in direct association with carbon credits. **Buyer motivation:** desire for a localised (that is, close to the buyer) nature-based solution to voluntary carbon offsetting. This mechanism includes 'stapling' biodiversity credits to carbon credits and selling the bundle.

2.7.3 Standards for biodiversity credits schemes

In recent years, biodiversity credits or biodiversity 'offsets' have been developed and, under certain criteria, are considered to align with the global Sustainable Development Goals (SDGs).¹

Standards available for use for the creation of biodiversity credits include:

- 1 Gold Standard for the Global Goals: <https://www.goldstandard.org/articles/gold-standard-global-goals>
- 2 Plan Vivo Standard: <https://www.planvivo.org/>
- 3 Sustainable Development Verified Impact (SD VISta) Standard (operated by Verra): <https://verra.org/project/sd-vista/>

¹ See: <https://sdgfinance.undp.org/>

2.7.4 Implementation of biodiversity credits schemes

Key Steps for Implementing Biodiversity Credits:

- 1 Seek grant funding to undertake:
 - a project scoping study to evaluate potential for biodiversity credit project development using invasive species management as a key activity. **Outcome:** short list of possible pilot projects.
 - up to three pilot project scoping studies. **Outcome:** Readiness to seek project development funding to undertake pilot projects.
- 2 Conduct a detailed scoping study for each pilot project. **Outcome:** Investment readiness for viable pilot projects. Able to register project with biodiversity standard.
- 3 Assign project developer to coordinate and manage project development activities.
- 4 Determine a preferred sustainable financing modality (type of investment) to fund project development.
- 5 Design capital structure for investment vehicle.
- 6 Undertake fundraising.
- 7 Undertake project development (including biodiversity credit methodology development).
- 8 Validate Project Description (containing project business plan and management plan) and biodiversity credit methodology.
- 9 Implement and monitor project.
- 10 Verify periodic project monitoring reports.
- 11 Issue biodiversity credits.
- 12 Monetise biodiversity credits through a carbon and/or biodiversity credit reseller.
- 13 Disburse revenues according to benefit-sharing plan and associated agreements (including debt servicing).



Uafato, Samoa, is designated as a Manumea-friendly village supporting the conservation of Manumea (*Didunculus strigirostris*). Management of the 800 metre Uafato Bird Hide Trail within a 2,500 hectare conservation area (est. 2018) is supported in part by the fees from guided tours. Photo: Samoa Conservation Society

3 Sustainable Financing Modalities

Sustainable financing **modalities** refer to investment to cover capital expenditure costs that enable sustainable revenue streams to be ready to deliver their sustainable cash flows.

Whereas sustainable revenue streams deliver cash flows to fund the operational expenditures of invasive species projects, sustainable financing modalities are ways of setting up the project programme infrastructure, planning, and project/programme development required in the start-up phase.

Investment is needed at the outset because the ability to generate revenue at the early stage is often not enough to cover both the start-up costs and the operational expenditures during the early years.

Start-up investment can come from a grant or a loan. If start-up grants are not available, or the initiative seeks to be fully self-financing, then capital investment will be required from some form of debt or equity financing.

Most sustainable financing modalities have some outcome or results-based performance requirement. This means that activities and programmes seeking this type of support must measure, report, and verify the social and/or environment performance of investments, ensuring transparency and accountability.

3.1 Categories of Sustainable Financing Modalities

Sustainable financing modalities can be divided into three broad and overlapping categories:

- 1 Impact investments are investments that generate a non-financial beneficial impact alongside a financial return. They include impact bonds, pooled funds, and crowd funding.
- 2 Blended finance is finance that plays a key role in unlocking private financing capacity by reducing or taking away risks from private investment. It includes catalytic capital, such as concessionary debt, hybrid instruments, and guarantees.
- 3 Philanthropic and public development finance are funds that are not paid back. They include debt-for-nature swaps and grants.



4 Sustainable Business Models

Sustainable business models are plans for specific types of projects or initiatives that combine sustainable revenue streams with sustainable financing modalities to deliver a sustainable financing outcome.

Governments, non-government organisations, and/or communities that are committed to sustaining invasive species management activities in an on-going manner will need to develop a sustainable business model and an institutional structure that is ready for engaging in sustainable financing.

A framework to deliver this readiness should include, among other things, community consultation and co-design of sustainable business model(s) and the development of an effective sustainable organisational structure to operate the business model.

In addition to community engagement, all business models will require the development of infrastructure or frameworks to undertake the invasive species management activities. This includes governance structures for transparent decision-making and to receive and distribute revenue. Some key components of this infrastructure are listed below.

A range of business models are possible. In the report titled *Sustainable Finance for Invasive Species Management in the Pacific*, there are two examples of the development of biodiversity bonds for the management of invasive species on Mount Talau National Park (Tonga) and Motutala Islet (Tuvalu).

4.1 Community Consultation and Co-Design

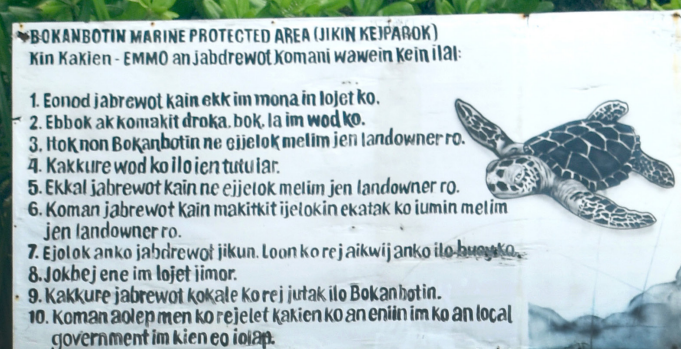
Key Steps for Community Consultation and Co-Design of a Business Model:

- 1 Identify the invasive species interventions sought by the community.
- 2 Identify invasive species management outcomes sought by the community.
- 3 Co-design sustainable business models for invasive species management interventions.
- 4 Engage an existing entity or establish a new entity to manage and operate the sustainable business model(s). Existing entities could include villages and/or schools that elect to adopt a natural area for continuing invasive species management. A new entity established for this purpose could be co-owned and co-governed by the community and an external support entity that provides technical and financing support.

4.2 Enabling Infrastructure

Key Components for the Development of Enabling Infrastructure:

- 1 A project owner entity (such as a community company or trust) that represents the owners of the natural resource on which the invasive species activity is to occur and that will be the counter-party to any transaction with a supplier of sustainable revenue streams.
- 2 A governance entity for the project owner entity (such as an existing community governance structure or a specially designed governing entity for the invasive species management initiative) that provides transparent decisions about the project activities and associated financing arrangements.
- 3 A management entity that coordinates the project operations (including employing staff and engaging subcontractors) and operates their part of the sustainable business model.
- 4 A governing board for the management entity that:
 - defines and safeguards the business (by defining its constitution, vision, and mission statement, for example),
 - safeguards the financial discipline of the management entity,
 - can represent the management entity in advocacy and financing, and
 - represents and safeguards the dual and mutually reinforcing interests of the local community and external experts.
- 5 An entity that provides technical and financing support to the management entity.
- 6 A financing entity focused solely on safeguarding the dual interests of:
 - the representatives of the management entity and
 - the representatives of the entity providing the sustainable financing modality.



The landowners of Bokan Botin, Republic of Marshall Islands, have developed a multi-year management plan that includes a no-take conservation area, representing opportunity costs. A gap in long-term funding is identified as one of the key challenges for this whole-of-island management plan. Photo: Marshall Islands Marine Resources Authority

5 Conclusion

Sustainable financing for invasive species management is all about securing on-going sources of funding to do this important work. Ideally, invasive species managers will not need to rely solely on grant funding. Sustainable financing in practice involves a combination of a sustainable revenue stream and a sustainable financing modality, brought together in a sustainable business model.

The core of a sustainable financing initiative for invasive species management is the relationship between costs and revenues required to meet these costs for the management intervention across a project period or in perpetuity. Once this has been determined, there are many potential ways to integrate this information into a sustainable business model.

On-going invasive species management will need to develop a business model capable of delivering on-going support. Governments or communities seeking to implement long-term management measures may require the development of an organisational structure capable of driving a sustainable business model with sufficient scope to deliver this on-going support. This organisational structure will likely need to include a local community entity, a management service provider, and potentially a financing entity to enable the inflow of revenue from a sustainable financing modality.



Rock Islands, Palau. Palau applies a levy, the Pristine Paradise Environmental Fee (implemented in 2018), to visitors upon their departure. A portion of this levy is committed to a 'green fund' for environmental management. Photo: © Stuart Chape

6 Key terms and acronyms

Biodiversity credits	An economic instrument that can be used to finance biodiversity-enhancing actions (such as protecting or restoring species, ecosystems, or natural habitats) through the creation and sale of biodiversity units.
Bond	A fixed income debt instrument that represents a loan made by an investor to a borrower (typically a corporation or government).
Carbon credits	A tradeable permit or certificate that represents one ton of carbon dioxide or an equivalent of another greenhouse gas.
Carbon market	A market where carbon credits are bought and sold. It consists of privately organised carbon crediting schemes which supply mitigation units to private buyers who want to offset their carbon footprint. See 'voluntary carbon markets'.
Carbon sequestration	The process of capturing and storing carbon dioxide.
Community bond	A debt financing tool issued by a non-profit organisation enabling it to take loans of varying sizes. Those who purchase community bonds are paid interest for investing in a project, and the issuing organisation gains access to capital.
Ecological infrastructure	Naturally functioning ecosystems that provide benefits to human wellbeing (ecosystem services), including cultural services.
Externalities	Costs or benefits imposed on an external third party. These are also referred to as 'spill-over' effects or unintended consequences of activities. For example, healthy natural systems provide the externalities of natural resources or public health.
Green bonds	A type of debt issued by a public or private institution to finance green projects that will have a beneficial effect on the environment.
Levies	Taxes imposed on certain groups, products, or activities to contribute money for particular purposes. For example, in 2017, Fiji introduced a levy on single-use plastic bags to support climate resilience programmes.
Payment for ecosystem services	Continual series of payments to landowners who agree to steward ecosystem services. Typically refers to a suite of economic arrangements used to reward the conservation of ecosystem services.
Polluter-pays principle	Polluters bear the costs of their pollution. By applying the principle, polluters are incentivised to avoid environmental damage and held responsible for the pollution they cause. It is also the polluter, and not the taxpayer, who covers the cost of remediation.
SDG bond	A fixed income debt instrument for funding projects aligned with achieving the Sustainable Development Goals of the United Nation's Agenda 2030.
Sustainable financing	Process or ability to secure sufficient, stable, predictable, and long-term financial resources to cover the full costs of delivery of an activity's intended outcomes.
Voluntary carbon markets	Markets where organisations, events, or products measure their carbon pollution, reduce their carbon pollution, and then voluntarily compensate for their residual emissions by purchasing and cancelling carbon credits. The main goal in voluntary carbon markets is the reduction of the atmospheric level of carbon dioxide and other greenhouse gases to reduce the effects of global climate change.

7 For more information

The [Battler Resource Base](#) contains information and materials for battling invasive species in the Pacific. Information on invasive species management in the Pacific can be found on the [SPREP website](#). Additional information on invasive species management can be obtained from [PRISMSS](#).

For a desktop review of sustainable financing mechanisms in the Pacific, see [Sustainable Finance for Invasive Species Management in the Pacific](#).

8 Key references

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Niue invasives management team undergoing training. Training and staff time is both an up-front and ongoing operational cost. Photo: Huggard Tongatule



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Protect our islands from invasive species



Håfa Adâi

Aloha

Mogetin

Rahn Anim

Iokwe

Alii

Kaselehlie Len Wo

Mauri

Ekawomir Omo

Mālō te ma'uli

Halo

Tālofa nī

Halo

Tālofa

Halo

Tālofa

Ni sa Bula Fakaalofa lahi atu

Bonjour

Mālō e lelei

Kia Orana

Ia Orana
Bonjour

Hello

Kia Ora

