

# Invasive Species in Vanuatu

## Media guide



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Environmental Education

## Common weeds and pests in Vanuatu



*Merremia peltata*  
– Big Leaf Rope



*Mikania micrantha*  
– Mile-a-minute



*Cassia/Senna tora* – Tora



*Solanum torvum* – Pico



*Sida acuta*  
– Broom Weed



*Mimosa diplotricha*  
– Giant Sensitive Plant



*Mimosa pudica* –  
Sensitive Grass



*Lantana camara* –  
Lantana



*Solenopsis invicta*  
– Fire Ant



*Acridotheres tristis*  
– Indian Mynah Bird



*Achatina fulica* – Giant  
African Land Snail



*Rattus exulans* – Pacific Rat

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# Distribution

This map shows the distribution of invasive species across Vanuatu. The icons represent different species on each island. These include both flora and fauna. Refer to the key below.



## Key

-  Big leaf rope
-  Mile-a-minute
-  Pico
-  Broom weed
-  Giant sensitive plant
-  Common sensitive plant
-  Indian Mynah
-  Giant African snail
-  Red imported fire ant
-  Tora



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## Acronyms

RAP – Rapid Assessment of Perceptions

SIDS – Small Island Developing States

SPREP – South Pacific Regional Environmental Programs

DOF – Department of Forestry

DEPC – Department of Environmental Protection and Conservation

DARD – Department of Agriculture and Rural Development

FSA – Farm Support Association

DBS – Department of Bio-Security

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## Foreword

### Invasive Species Media Guide

Live & Learn Vanuatu's Invasive Species Project Grant Contract Number: DCIENV/ 2010/220-124 "Testing and Modelling preventative measures to limit the spread and ecological impact of invasive species in Small Islands Developing States (SIDs)" commenced in 2011 and is funded by the European Union (EU).

It is a five year project that aims to educate communities on invasive species and work with Government to address issues caused by invasive species. The project also focuses on the management of one particularly damaging invasive species, *Merremia peltata*, or Big Lif Rop as it is commonly known in Vanuatu. Big Lif is considered to be one of the biggest drivers of deforestation in Vanuatu due to its capacity to overtake disturbed forest areas. The profound impact of *Merremia peltata* on ecosystems in Vanuatu is now better understood but communities still lack the complete understanding, time and incentive to fully participate in preventing its spread and in engaging long term management plans to control the vine in Vanuatu.

This media guide will provide a platform for journalists to enhance their understanding on the issue of invasive species in Vanuatu. It will also assist the media to not only educate, but also to advocate for and connect communities with problems of invasive species to relevant government offices who can assist them in eradicating the problem. As we know, the media plays a vital role in keeping citizens of this country well informed on situations happening around them, in their communities, in the government, the economy and in nongovernmental organisations and civil societies.

The guide also provides steps for the public and communities to take to control this invasive vine.

Live & Learn hopes that this Media Guide will help you to become more familiar with Big Lif Rop (*Merremia peltata*) in particular, and the negative impacts on communities of invasive species in general.

Dr Andrina KL Thomas, Country Manager  
26 July 2013



# Introduction

## Live & Learn Vanuatu and the Invasive Species Project

Live & Learn Vanuatu is a non-governmental, not-for-profit organisation which aims to promote greater understanding of and action towards environmental and human sustainability through education, communication and collaboration in its ultimate desire to reduce poverty in Vanuatu.

As part of this project, 'Testing and modelling preventative measures to limit the spread and ecological impact of invasive species in Small Islands Developing States (SIDS)', Live & Learn Vanuatu has produced this media guide. This is because the media have a vital role to play in addressing environmental issues in Vanuatu.

The central aim of this project is to minimise the spread of invasive species in Vanuatu so as to positively impact on biodiversity, communities' well-being and food security. The core steps to achieving this goal include:

- ◆ Conducting a RAP – Rapid Assessment of Perceptions – which investigates how communities perceive the threat of invasive species in their localities;
- ◆ Identifying priority areas for management;
- ◆ Developing a National Invasive Species Action Plan;
- ◆ Developing an integrated invasive species management model;
- ◆ Conducting field trials in weed management techniques;

- ❖ Increasing awareness and knowledge about invasive species through a set of educational resources (including this media guide);
- ❖ Replication of the whole model into other SIDS.

Live & Learn Vanuatu is undertaking this project with the support of funding from the European Commission.

## Purpose of the Media Guide

This Media Guide aims to:

- ❖ Heighten awareness within the media and communications sector about the issue of invasive species in Vanuatu;
- ❖ Increase knowledge within the media and communications sector regarding the significant impacts invasive species are having on the natural environment, communities and Vanuatu's economy;
- ❖ Increase knowledge about the types of invasive species that occur in Vanuatu and how to manage them;
- ❖ Provide guidance and information on best practice journalism;
- ❖ Provide guidance and information on the unique challenges that environmental journalists and communicators face and on how to effectively report on environmental issues.

## Who is this Resource for?

This Invasive Species Media Guide targets journalists, reporters, photographers, environmental writers and other people working within, or having an interest in, media and communication roles in Vanuatu. It is written specifically for those people who work on environmental and sustainability issues, although there are many tips within the guide that relate to good journalism practices in general. Throughout this guide, the various roles played by actors in the media are collectively referred to as *journalists, reporters or communicators*.

## Why is the Issue of Invasive Species Important?

At first glance, weeds and pests may not seem to be the biggest threat that Vanuatu faces. After all, there are many urgent and critical issues that face the state and support organisations and require the attention of the media. Nevertheless, it is a fact that impacts from invasive species do negatively affect all aspects of Vanuatu society, either directly or indirectly. This is especially so for subsistence communities, which represent the majority of Vanuatu's population, who directly

rely on the health of their natural environment to support their livelihoods and communities.

Weeds and pests negatively affect the health of forests, biodiversity, food gardens, commercial agriculture, food security, tourism, the wider economy and community health. Generally speaking, invasive species compete with (and often out compete) and/or directly harm the useful natural resources on which Vanuatu's society and economy are based. The impacts from this competition and subsequent degradation of the natural environment are significant, real and costly.

Section 1 contains more details regarding the impacts of invasive species on the natural systems, people and the economy.

## When to use the Guide

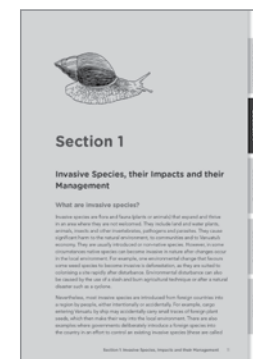
Journalists and communicators can use this guide when reporting specifically on invasive species, or when reporting on environmental issues in general. It contains a large section of technical background information regarding invasive species, presented in a non-technical manner, and includes some information and guidance about environmental issues in general.

This guide can also be used as a general guide for best practice journalism, and more specifically on how to report on environmental issues.

## How to use the Guide

The guide is broken down into four main sections:

### Section 1: Invasive species and their impacts and management



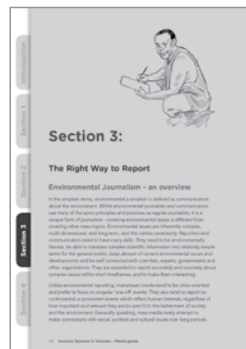
This first section introduces the concept of invasive species and outlines the impacts that invasive flora and fauna (plants and animals) can have on the natural environment, on communities and on Vanuatu's economy.

## Section 2: Invasive Species Profiles



This section aims to build your knowledge of the pest and weed species that present the biggest threats to Vanuatu and how to identify them. These identification profiles are accompanied by a series of high quality images which help the reader in the identification process. The final part of section 1 considers management responses for invasive species in Vanuatu – what communities, organisations and governments can be doing to minimise their negative impacts.

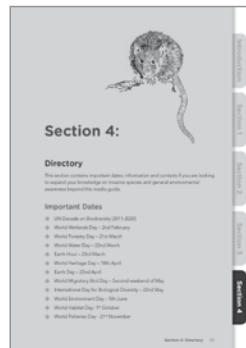
## Section 3: The right way of reporting



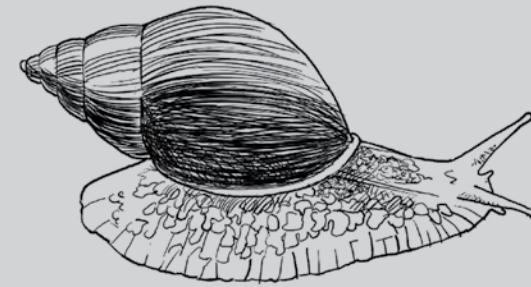
This section is a guide on how to undertake responsible and effective environmental reporting. This section can be applied to any environmental issues, not just invasive species. This section begins with an overview of what environmental journalism is, its importance in Vanuatu, some of the main criticisms of environmental reporting to date and the unique challenges that environmental journalists face. The section then ends with a brief overview of the principles of journalism in general and the relevant codes of conduct for Vanuatu journalists. The

last part focuses on practical aspects – on how best to go about preparing for, conducting and writing a story.

## Section 4: Important dates, information and contacts



The final section of this media guide provides readers with additional information such as key dates, contacts and links for further information and reading. The intention of this section is to provide further guidance and information for those wishing to know more about the topic, and for information that is beyond the scope of this guide. A glossary of technical terms is provided to assist journalists to improve their own level of environmental literacy, specifically about invasive species.



# Section 1

## Invasive Species, Impacts and Management

### What are Invasive Species?

Invasive species are flora and fauna (plants or animals) that expand and thrive in an area where they are not welcomed. They include land and water plants, animals, insects and other invertebrates, pathogens and parasites. They cause significant harm to the natural environment, to communities and to Vanuatu's economy. They are usually introduced or non-native species. However, in some circumstances native species can become invasive in nature after changes occur in the local environment. For example, one environmental change that favours some weed species to become invasive is deforestation, as they are suited to colonising a site rapidly after disturbance. Environmental disturbance can also be caused by the use of a slash and burn agricultural technique or after a natural disaster such as a cyclone.

Nevertheless, most invasive species are introduced from foreign countries into a region by people, either intentionally or accidentally. For example, cargo entering Vanuatu by ship may accidentally carry small traces of foreign plant seeds, which then make their way into the local environment. There are also examples where governments deliberately introduce a foreign species into the country in an effort to control an existing invasive species (these are called



biological control agents). For instance, *Euglandina rosea*, commonly known as the Rosy Wolf Snail or Cannibal Snail, was purposely introduced in an effort to control *Achatina filica* (Giant African Snail). Although *Euglandina rosea* has in some instances attacked *Achatina filica*, there is worrying evidence that this cannibal snail has caused the extinction of numerous native snails in Vanuatu and in other Pacific countries, as it prefers preying on smaller snails. The risk is that Vanuatu may now lose a significant amount, if not all, of its native snail species (Ruben Bakeo & Francis Qarani, FAO report, 2005). These actions seem unthinkable in hindsight but at the time of introduction were considered to be appropriate management solutions.

Not all introduced species into an environment become invasive. With the world's connectivity, many new species are regularly introduced into Pacific nations. Some species proliferate, expand and damage the environment, while others don't. Whether or not this happens depends on the individual species' requirements and the environmental conditions into which they have been introduced. This manual is concerned about particular invasive species that have proliferated and are causing damage within Vanuatu's environment.

### Weeds vs. Animal Pests – What's the difference?

A weed is an invasive plant species (e.g. Big Leaf Rope) and an animal pest is an invasive animal species (e.g. an Indian Mynah bird). The phrase 'invasive species' can be used to describe both weeds and pests.



## Invasive Species and the Environment

### Reconceptualising the Environment

What is the environment? How would you define it? What living and non-living things does it include and what services does it provide? When we think and talk about the environment, many of us tend to associate it with the natural world - things like forests, wildlife, the ocean, climate and the weather. These are, of course, all part of the environment. However, the environment also represents almost everything around us, not just the natural things. This includes our schools, hospitals, food gardens, tourism activities, infrastructure, businesses and our industries. Everything that exists in our communities and our economies essentially comes from the natural environment in one way or another. So it makes sense that we start to think of it as one interconnected and interdependent system.

### The Environment - Linking the Elements

This way of reconceptualising the environment is an important first step in addressing any modern-day environmental issue, including that of invasive species. Researchers have found that when reporting on environmental issues the media often constrict their interpretation of environmental problems, ignoring the economic and social consequences of the exploitation of natural resources. This is particularly the case for climate change, where the media often accurately report on the causes of climate change, but do not link this to human actions that cause climate change (mainly by industrialised nations) and also require behavioural changes (by residents of Vanuatu) to mitigate the impacts from climate change (Plataforma SINC, 2009).

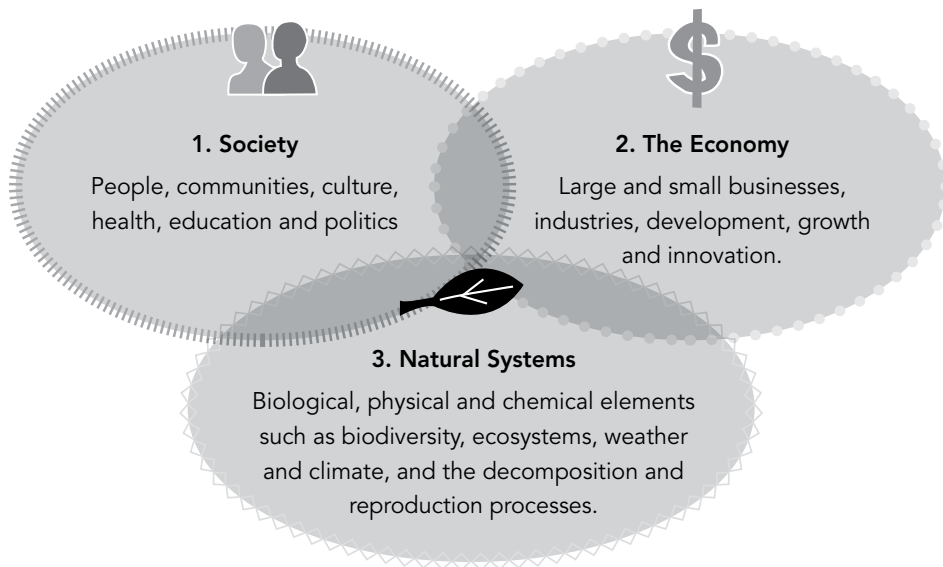
When presenting stories about invasive species (or environmental issues in general), it is important to present the information in a way that highlights these multi-dimensional issues and connections. What are the impacts and issues for communities? What impact does it have on the natural systems and how does this in turn affect the economy? How do holistic solutions address all of these issues in an integrated way? These important questions will be answered as the guide progresses.

In summary, when presenting environmental issues in the media, consider presenting the 'whole' picture including impacts on and issues for:

- ◆ natural systems
- ◆ society, and
- ◆ the economy.

## The Environment - Three Elements

The environment is a complex and interconnected system. There are many relationships and every action has an impact somewhere else in the system. To simplify things, it is helpful to think of the environment as encompassing three interdependent elements:



In a healthy environment, all three elements co-exist in a balanced way. Sustainable development strives towards development that balances these elements so they can coexist into the future.

### Image of sustainable development

This photograph is a simple compost toilet initiated by Live & Learn Environmental Education in the Pacific to help local communities address sanitation issues. A composting toilet is an example of inexpensive sustainable development. No water is needed and the toilet has a high storage capacity so it can last longer. There is no smell in the toilet room if the toilet is properly maintained and it is suitable for a large family of ten people. Pollution of ground water and soil is prevented by having a sealed chamber. The chamber sits above ground so the digging of a pit is not required. It is a permanent structure which can be located anywhere and does not need to be rebuilt or moved when it is full. Valuable compost is produced for soil conditioning and may be used as fertilizer in gardens and so on.



Compost Toilet

## Case Study

### Jacob's Story

Jacob's story shows how our world is interconnected. It shows us how all living things, including humans, are reliant upon each other for their health and the health of the whole system. The issue of invasive species is woven into the story giving us an appreciation of how just one change in the system can affect so many different areas.

*Jacob is a farmer on Tanna Island in the southern province. He has a wife, Norah, and four children David, Sam, Leimala and Netty. Jacob and his family grow their own food in a garden located at the back of their hut. They grow sweet potato. When seasons are good, Jacob grows kava as a cash crop to gain some extra income.*

*Jacob's brother, Kalwas, works for an ecotour company that runs hiking tours for visitors into the forests of Vanuatu. Over the years, it has developed a reputation with international tourists for being an excellent bird watching operation and business has been good. Kalwas' job is to lead the tours. Kalwas is also married with three children. He enjoys working for the tour company and makes a good living from it.*

*In the last five to ten years, *Merremia peltata* has become more noticeable in the local area. The weed has taken over and choked out large stands of the native forests. More recently, Kalwas has noticed that there are also more Indian Mynas in the area. Now there are fewer native birds to be found than usual. There has also been a drop in the numbers of tourists booking into the tours. As a result, Kalwas' work hours have been cut back from five days a week to only three days a week. The loss of income means that Kalwas' food budget is tight. They have started to eat with Jacob and his family at least two nights a week to get by.*

*Jacob was always careful to leave as much of the forest as he could when he prepared his land for agriculture. He knew that having a balance between the natural environment and his family's needs was the best way to go in the long-term. Despite this, the *Merremia peltata* infestation has also started spreading into Jacob's food crops, smothering them completely. This year's yields are much lower than those of the previous few years. There is barely enough food for everyone in an evening and now Kalwas' family is also joining them for dinner, which is making things really difficult.*

*Jacob has noticed that his children are less playful than usual and have started skipping school. They say they are too tired to walk the distance and prefer to lounge around the hut. Netty, the youngest, has caught a bad cough and sleeps for much of the day. She seems unable to shake it off. Jacob and Norah are worried about their future.*

## Impacts of Invasive Species



### Impacts of Invasive Species on the Natural Environment

Island environments are unique and ecologically very important. Their ecosystems and native species are found nowhere else in the world. They have disproportionately high levels of native species compared to continental regions. They also serve as critical breeding sites for vulnerable migratory species such as marine turtles and sea birds. However, it is their uniqueness which makes them especially fragile to changes, including changes imposed by invasive species. Because of their isolation, island species and ecosystems have not evolved defence mechanisms and competitive behaviours or characteristics to deal with the threats and impacts of invasive species. Overall, this is resulting in the alteration of island ecosystems, the loss of important ecosystem services, species' decline and in some cases species' extinction.

Invasive species proliferate in their new ecosystems because they have an unfair advantage over native species. In natural ecosystems, native species have evolved together over long periods of time meaning that they have developed many checks and balances (e.g. predation, diseases, competitive characteristics and behaviours) that keep the ecosystems balanced and healthy. Outside organisms are not constrained by these conditions and as a consequence their numbers often drastically increase, with significant impacts. Invasive species disrupt the natural ecological equilibrium, causing a shift in the ecosystem.

Invasive species disrupt native communities and ecological processes. They compete with native species for food, shelter, space and other essential resources needed to survive. This stresses and displaces native species, resulting in an overall decline in biodiversity with some species becoming threatened or even extinct. Sometimes invasive species kill native species outright through predation or attack. For example, Indian Mynah birds bully and attack native birds, eat their chicks and eggs and take over their nesting holes. In Vanuatu, this problem has led to a significant decline in the number and diversity of native birds. Even if native species are not completely eliminated, invasive species reduce the quality and diversity of ecosystems, which make them more susceptible to disease and disturbance (e.g. natural disasters, new invasive species). This includes reducing the quality and quantity of habitats.

Invasive species also compromise essential ecosystem services that the natural environment provides. 'Ecosystem services' is a term used to describe the resources and processes that the natural world provides to humans and animals

for their survival. These services are free and essential to life. They include plants making the fresh air we breathe, wetlands cleaning our waterways and micro-organisms decomposing our waste products. The qualities of ecosystem services are reduced as environmental pollution, land degradation and invasive species increase. Invasive species can damage waterways and wetlands resulting in poor water supply and quality, interfere with and change nutrient cycles, increase soil erosion and runoff and change the habitat of aquatic ecosystems.

#### In summary:

- ❖ Island environments are unique and fragile, making them especially vulnerable to invasive species.
- ❖ Invasive species cause biodiversity loss and in extreme cases extinction through competition and predation.
- ❖ Invasive species reduce the quality and quantity of habitat.
- ❖ Invasive species alter and degrade important ecosystem services.
- ❖ Invasive species reduce biodiversity, making environments less resilient to other changes.



### Impacts of Invasive Species on People

Weeds and animal pests reduce agricultural productivity and food security in communities. Food security is a nation's or a community's ability to ensure it has ongoing access to adequate nutritious food to keep its population healthy and active into the future. Most people in Vanuatu and the Pacific survive through subsistence level livelihoods such as small-scale agriculture, fishing, forestry and hunting/gathering of food. This means that they are directly reliant on the health of their local environment for their own health.

Invasive species can threaten this unique Pacific lifestyle in two main ways. Firstly, animal pests and weeds damage, injure or consume crops and livestock, which result in poorer crop and animal growth and less food for the community. According to inception workshops held in Loru, Port Resolution and Ipota, all the three communities came up with the same concern, that feral pigs are known to damage and eat crops and gardens in some areas of Vanuatu. Secondly, invasive species degrade and take over natural systems (as explained above), which in turn reduce the quality of the environment and resources and services available to agricultural crops and animals.

The combined social effects from reduced agricultural productivity and food security can be significant. Families receive less income and less food, resulting

in domestic stress. With people less likely to receive a nutritious diet, this leaves them more susceptible to disease and illness. Overall productivity within a community then also declines, which further exacerbates the problem. Poor community health, poor school attendance and overall poverty may result in extreme cases of food insecurity. The whole family unit can be affected by invasive species.

Invasive species are also hazardous. They carry and transmit diseases, which again increase the health risks to humans and their domestic animals. For example, in urban areas of many countries the mosquito species *Aedes aegypti*, which spreads dengue fever, is increasing in numbers and becoming a real pest. This is resulting in more people contracting the potentially life threatening disease. Invasive species can also be poisonous to humans and livestock. Fire ants inflict a painful sting to humans when they are disturbed, which can cause an allergic reaction for some people. They can also reduce a community's aesthetic enjoyment of its natural area. Weeds and pests dominate environments and reduce overall biodiversity. This creates a feeling of living in a monoculture rather than in a diverse and beautiful environment.

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**In summary:**

- ❖ Invasive species can reduce agricultural productivity and food security, which have many flow-on affects to communities.
  - ❖ Reduced food security can increase overall poverty and hardship in communities.
  - ❖ Invasive species are hazardous and can increase community health issues.
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## Impacts of Invasive Species on the Economy

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Much of Vanuatu's economy is reliant on natural resources. Approximately 80 percent of Vanuatu's economy is agricultural, and includes subsistence level fishing and farming and commercial enterprises such as cattle, cocoa, copra and timber. Income is earned from exporting these goods, particularly from cattle. Vanuatu also has an important tourism industry, which hinges on the health and beauty of its natural environment and on the rich cultural diversity of its people. Forty percent of Vanuatu's GDP and one third of the nation's formal employment is attributable to tourism and its related industries.

It is those industries that are based on natural resources which are most affected by the damage that invasive species inflict. As was explained above, invasive species cause degradation of natural resources resulting in a loss of income for families and organisations involved in these industries (affecting most of the people in Vanuatu). People lose income through direct production losses, for example lower crop yields will result in lower market returns. They also lose income because of the extra money they often need to spend managing pests and weeds. For example, in some communities like Matantas on Espiritu Santo and Green Hill on Tanna with conservation areas, *Merremia peltata* encroaches on conservation areas and reduces their aesthetic value. It smothers trees, thus destroying the feeding ground and shelter for wildlife, which results in loss of tourism in the area, which in its turn means less income for the community. Governments also spend a lot of money in trying to combat invasive species, which diverts funds away from other much needed areas, such as infrastructural development and education. Invasive species can also cause damage to basic public infrastructures such as power plants, roads, water treatment systems, telecommunications equipment and boating infrastructure. For example, invasive species damage roads and cause higher road maintenance costs in Vanuatu. They grow alongside the roads, reducing drivers' vision, with the result that the roads have to be maintained every three months.

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**In summary:**

- ❖ Invasive species mostly threaten industries that are reliant on natural resources, including tourism and agriculture.
  - ❖ Most people's livelihoods in Vanuatu are connected to natural resource-based industries.
  - ❖ Invasive species reduce profits and incomes for industries and impose significant management costs.
  - ❖ Governments often have to spend large sums of money managing invasive species.
-

Thankfully, there are many practical and effective actions that communities and governments can take to manage invasive species and avoid such negative impacts on natural systems, people and the economy. These are considered in detail in Section 2.

## Why are invasive species so successful?

Why are invasive species so successful? What sets them apart from other species and allows them to expand and dominate an environment? Most invasive species carry genetic and behavioural characteristics that give them an edge. They often carry either one or several of the following characteristics:

- ◆ They have high reproduction rates (e.g. The Indian Mynah bird can reproduce two to three times per year).
- ◆ They are relatively long-lived.
- ◆ Weeds are often ruderal or pioneer species, which means they are able to colonise quickly after disturbance occurs e.g. *Merremia peltata*.
- ◆ Weeds often have high and effective dispersal rates.
- ◆ Some weeds can reproduce vegetatively (without seed).
- ◆ They have high genetic variability.
- ◆ They are tough and adaptable – they are tolerant of a wide range of habitats and conditions.
- ◆ They have a broad diet.
- ◆ Pest species are often sociable, aggressive or competitive and unafraid of humans.



# Invasive Species Profiles

**This section aims to build your knowledge of the pest and weed species that present the biggest threats to Vanuatu and how to identify them. An important strategy in controlling pests and weeds in Vanuatu is community-based management. One of the first steps in achieving this is for people to have an awareness of the main threatening invasive species in Vanuatu and how to recognise them. The role of the media and communicators is to bring this knowledge to communities.**

## Identifying invasive species

One of the most important and fundamental steps in being able to manage invasive species is to be able to recognise them. When people can identify invasive species they can then start mapping and understanding the scale of the problem. Identifying weeds and pests can be simple and straightforward providing that you have the essential information – you don't need to be an expert. This section will provide you with all of the information that you need and much of the hard work has already been done for you. Detailed and complex plant descriptions have been simplified and translated into easily understandable language which can be relayed to the public without significant amounts of reworking.

In identifying weeds, a set of standard plant characteristics is normally presented with accompanying details and descriptions. Although there are many ways to present this information, the most important characteristics include:

- ❖ **Plant type and growth form** – What type of plant is the weed? Is it a tree, vine, shrub, grass, herb, aquatic plant or a succulent? What is its growth form? Does it grow upright, creep along the ground, climb or float?
- ❖ **Leaves** – What shape, colour and size are the leaves? Are there any special features?
- ❖ **Flowers** – What is the colour and shape of the flower?
- ❖ **Fruit and Seeds** – What is the colour, size and shape of the fruit? Where is it located on the plant?

Information on habitat preferences and distribution may also give clues as to the type of species. Detailed plant anatomy descriptions can be found in the accompanying technical manual to this media guide: *Pocket Guide on Invasive Species*.

In some ways, identifying pest species can be easier than identifying weeds. Animals move, make noises and have distinct behaviours and traits which can make their identification easier. However, many animals species can be hard to identify – take insects for instance – so it pays to know a few of the major identification characteristics of these animals:

- ❖ **Type of animal** – Is it a bird, amphibian, mammal, fish, insect or another type of animal?
- ❖ **Physical appearance** – What are its colour, markings, shape, size and distinguishing features?
- ❖ **Behaviour** – How does it move and interact with other species? What noises does it make?
- ❖ **Habitat** – In which ecosystems does it live? Does it build a nest or visit a particular environment (e.g. tree, wetland, soil type) frequently?

One of the best places to begin when trying to identify a pest or weed is to start with its distinguishing features. Distinguishing features are physical or behavioural characteristics that make the species stand out from other species. Knowing these about a certain species can give you a 'short-cut' in identifying the species. For example, one of the distinguishing physical features of the Indian Mynah bird is two large white patches underneath its wings, which are very noticeable when it flies. The bird also has a noticeable 'strut' when it walks. Knowing only these two pieces of information gives you a good head start.

In the next section, identification profiles are presented for the most threatening weed and pest species in Vanuatu. These are the species that you should focus on in your stories and reports. There are other pests and weed species that exist in Vanuatu (see the *Pocket Guide on Invasive Species*). However these are generally not as significant a pest or weed (however there can be local exceptions, check with your local community first). The profiles are presented according to the guiding characteristics and information outlined above.

### What's in a name?

Plants and animals are named in different ways depending on the situation. No one way is better than another. However it is good to be aware of the different systems.

**Botanical/Scientific names:** This is the internationally recognised scientific system of assigning two names to a species, the first name being the genus and the second name being the species. Western scientists and experts prefer this system.

**Common names:** Names given to plants and animals by the general, non-scientific community.

**Local names:** Local names given to species by local communities, these can be used in a local community context because everyone understands what is being discussed. Outside of a local community, it is probably better to use the scientific or common name.

#### For example:


<i>Merremia peltata</i>	Big leaf Rope	Big lif rop
(Botanical/Scientific name)	(Common name)	(Local name)

For each species profile in this section, all three names are provided.



## Weeds in Vanuatu

<b>Names</b>	Scientific	<i>Merremia peltata</i>
	Common	Big Leaf Rope
	Local (Bislama)	Big Lif Rop
		
<b>Description</b>	Plant type	Vine
	Growth form	Climber with underground tubers
	Leaves and stems	Broad heart-shaped leaves with purple veins underneath. Stems can be up to 20 metres long
	Flowers	Yellow and creamy white funnel-shaped flowers, 15-30 cm in length. Occur in clusters
	Fruits and Seeds	Dull brown seeds, capsules about 15 mm long
<b>Habitat</b>		Forests, roadsides, hillsides, disturbed areas
<b>Distribution</b>		Widely throughout Vanuatu below 300 meters elevation
<b>Country of Origin</b>		Indo-Pacific Region
<b>How it spreads</b>		Disturbance of the environment will stimulate growth. Reproduces both by seeds and by rooting from the stem.
<b>Management Options</b>		Merremia peltata Management Model is based on an "Integrated Approach" that combines physical removal of the weed with an agroforestry system that utilizes whitewood ( <i>Endospermum medullosum</i> ) canopy and kumala as a cover crop to suppress regrowth.

## Weeds in Vanuatu

<b>Names</b>	Scientific	<i>Mikania micrantha</i>
	Common	Mile-a-Minute
	Local (Bislama)	Wan Dei Rop
		
<b>Description</b>	Plant type	Vine
	Growth form	Climber
	Leaves and stems	Heart-shaped or triangular with a broad base and distinct tapered tip. 4-13 cm long
	Flowers	White to greenish-white small flowers arranged in dense clumps, 4 individual flower heads. 4-6 mm long
	Fruits and Seeds	Black in colour, 5-angled, 2 mm long and each has a terminal pappus of white bristles that enables dispersal by wind.
<b>Habitat</b>		Disturbed forests, hillsides, beside waterways, roadsides, plantations and cultivated crops
<b>Distribution</b>		Widely throughout Vanuatu
<b>Country of Origin</b>		Central and South America
<b>How it spreads</b>		Seeds are dispersed by the wind, on clothing and via animal hair
<b>Management Options:</b>		<ul style="list-style-type: none"> <li>Mikania micrantha is currently managed under Postentry-Biosecurity by a rust fungus named <i>Puccinia spegazzinii</i>, commonly known in Vanuatu as laplap leaves rust fungus. The fungus was imported from Papua New Guinea and has proved effective in PNG and Australia</li> <li>The fungus has been distributed around Efate and Tanna, particularly</li> </ul>
Government Control		
Cultural Control		<ul style="list-style-type: none"> <li>Slash and dehydrate in the sun</li> </ul>

## Weeds in Vanuatu


Names	Scientific	<i>Cassia tora</i> or <i>Senna tora</i>
	Common	Tora, Sicklepod
	Local (Bislama)	Wael Pinat
		
Description	Plant type	Herb
	Growth form	Erect plant, 1-2 meters tall, 1 meter wide
	Leaves and stems	Divided into three opposite pairs of leaflets, round at the end and wedge-shaped at the base, 4 cm long and 2 cm wide
	Flowers	Yellow flowers with 5 petals, 1 cm across
	Fruits and Seeds	Long, slender curved seed pod, 10-15 cm long, 3-5 mm wide. Seeds 3 mm long, brown and flat
Habitat	Cleared coastal country, open pastures, roadsides	
Distribution	Efate, Tanna, Santo, Malakula, West Ambae, Malo, Aore	
Country of Origin	Possible origin in South Asia. Thought to be widely occurring across tropical regions and the Americas	
How it spreads	Seeds through livestock	
Management Options	Slash and dehydrate in the sun	

## Weeds in Vanuatu


Names	Scientific	<i>Solanum torvum</i>
	Common	Turkey Berry, Pico
	Local (Bislama)	Pico
		
Description	Plant type	Shrub
	Growth form	Erect, usually 2-3 meters high, but can be up to 4mrs high
	Leaves and stems	Oval shaped leaves with a tapered tip and a rounded base, 15-20 cm long. Spines on stems which can cause impenetrable thickets
	Flowers	White with five lobes. 12-18 mm long, enclosing a yellow stamen inside
	Fruits and Seeds	Fruits are green berries (yellow when ripe), 10-15 mm in diameter which grow in clumps. They contain many flat, round and brown seeds
	Habitat	Open rural disturbed areas, roadsides, plantations, wastelands
Distribution	Efate, Tanna, Santo, Malakula, Pentecost, Epi, Tongoa, Aniwa	
Country of Origin	Americas, particularly tropical regions	
How it spreads	Birds eat the berries and spread the seeds through their droppings	
Management Options	Slash and burn	



## Weeds in Vanuatu

<b>Names</b>	Scientific	<i>Sida acuta</i>
	Common	Broom weed
	Local (Bislama)	Brum wid
		
<b>Description</b>	Plant type	Herb
	Growth form	<i>Sida acuta</i> is a small woody perennial shrub, growing to 1.0 m high. The main stem branches near the base.
	Leaves and stems	Leaves are alternate with toothed edges and hairy on the under surface.
	Flowers	Single pale yellow-orange flowers produce a capsule that breaks into segments when mature, each with 2 sharp curves.
	Seeds	Small and rough, triangular in shape and up to 1.5 mm long. Green in colour when young and reddish brown or black when dry.
<b>Habitat</b>		Pastures, crops, roadsides. Dislikes dry conditions
<b>Distribution</b>		Efate, Santo, Epi, Tanna, Malakula
<b>Country of Origin</b>		A pan-tropical weed perhaps originating from Central America
<b>How it spreads</b>		Dispersed by adhering to clothing, fur and mud on vehicles.
<b>Management Options</b>		Smaller plants: uproot and dehydrate in the sun. Bigger plants: slash and dehydrate in the sun. The government through the department of Biosecurity has identified <i>Calligrapha panthera</i> (sida beetle) as the biocontrol for <i>Sida acuta</i> (Broom weed). It has imported the beetle from Papua New Guinea, and is having it multiplied and distributed throughout the Islands of Vanuatu.

## Weeds in Vanuatu

<b>Names</b>	Scientific	<i>Mimosa diplotricha</i>
	Common	Giant sensitive plant
	Local (Bislama)	Waet Nil Gras
		
<b>Description</b>	Plant type	Shrub, up to 2 metres tall
	Growth form	Shrubby and sprawling, forms a dense thicket
	Leaves and stems	Bright green, feathery. Leaf segments carry pairs of 15-30 very small leaflets (6-12 mm long, 1.5 mm wide), which can be mistaken for the leaves themselves. Leaflets close when disturbed, injured or at night. Stems have sharp hooked prickles, 3-6 mm long.
	Flowers	Pale pink, round/ball shaped and fluffy. 12 mm in diameter
	Fruits and Seeds	Pods in clusters, about 10-35 mm long and 6 mm wide, covered in small prickles. Light brown, flat oval seeds, 2 mm long
	<b>Habitat</b>	
<b>Distribution</b>		Efate, Santo, Epi, Tanna, Malakula
<b>Country of Origin</b>		Brazil, tropical South America
<b>How it spreads</b>		Seeds spread by attaching to animal fur or clothing. Seed pods can float
<b>Management Options</b>		Slash; dehydrate in the sun and burn. Smaller plants may be uprooted from the soil and dehydrated in sun and burnt

## Weeds in Vanuatu

<b>Names</b>	Scientific	<i>Mimosa pudica</i>
	Common	Sensitive grass
	Local (Bislama)	Smol gras nil



<b>Description</b>	Plant type	Herb
	Growth form	Slightly woody at base with trailing habit with thorns and scattered prickles on internodes.
	Leaves and stems	Reddish leaflets 12-25 pairs, linear, acute and up to 9-12mm long and 1.5mm wide and sensitive when touched or disturbed are drawn back and folded.
	Flowers	Pinkish flowers, ovoid in shape and 9mm in diameter
	Fruits and Seeds	Small seeds up to five in one pod, flat and 3 to 5mm in diameter
<b>Impacts</b>	Preventing reproduction of other species and it forms a dense ground cover when fully grown. Thorns are harmful to human beings.	
<b>Habitat</b>	Open rural disturbed areas, roadsides, plantations, wastelands	
<b>Distribution</b>	Efate, Epi, Santo, Malakula, Tanna and the shepherds group	
<b>Country of Origin</b>	Brazil	
<b>How it spreads</b>	Seeds pods float and are spread by water as well as attached to fur, clothing and mud on vehicles.	
<b>Management Options</b>	Smaller plants are uprooted while bigger plants are slashed and dehydrated in the sun	

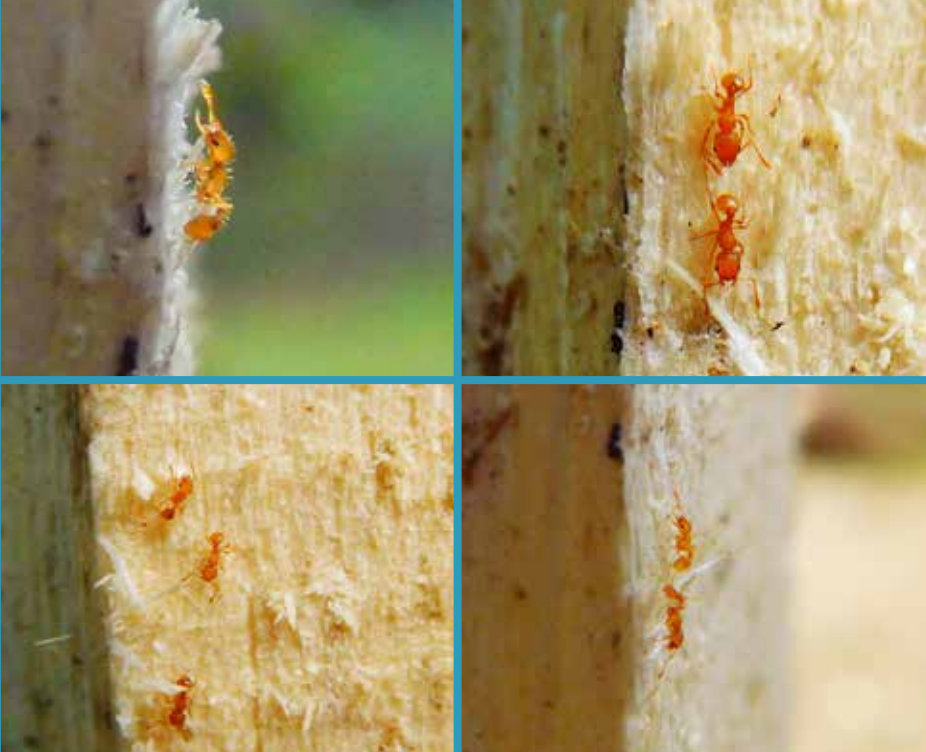
## Weeds in Vanuatu

<b>Names</b>	Scientific	<i>Lantana camara</i>
	Common	Lantana
	Local (Bislama)	Lantana/Blakbari




<b>Description</b>	Plant type	Shrub
	Growth form	Heavily branched, often forms a dense thicket
	Leaves and stems	Leaves egg-shaped, simple. Stems square with short hooked prickles. Can be very toxic if eaten.
	Flowers	Tube-shaped four-petalled flowers, arranged in clusters at the end of stems
	Fruits and Seeds	Berry-like fruit turning a deep purple colour when mature
	<b>Habitat</b>	Grows best in dry pastures, plantations, cultivated and waste lands
<b>Distribution</b>	Efate, Tanna, Malakula, Aneityum	
<b>Country of Origin</b>	South and Central America	
<b>How it spreads</b>	Seeds distributed by birds and other animals	
<b>Management Options</b>	Slash and dehydrate in the sun	


## Pests in Vanuatu

<b>Names</b>	Scientific	<i>Solenopsis invicta</i>
	Common	Little Fire Ant
	Local (Bislama)	Smol Faea Anis
<b>Organism type</b>	Insect	
		
<b>Physical Description</b>	A small aggressive ant, 2-6 mm long, coppery brown head and body with a darker abdomen. Inflicts a painful sting.	

<b>Habitat</b>	<p>Likes hot dry habitat. Occurs across a wide variety of landscapes including coastland, agricultural areas, backyards, forests and watercourses. More likely to establish in disturbed areas.</p> <p>Nests come in various shapes and sizes, can be inconspicuous but can also look like a dome shaped mound (up to 40 cm high). No obvious entry and exit holes. Internal structure looks like honeycomb. Ants of a variety of sizes will be present in the same nest.</p>
<b>Behaviour</b>	Aggressive and large in number. High densities mean it can dominate food sources in a locality, out-competing other species. Can breed and relocate quickly.
<b>Distribution</b>	Vanua Lava, Mota Lava, Gaua, Mota, Santo, Efate
<b>Country of Origin</b>	South America
<b>How it spreads</b>	Naturally: females can fly up to 2 km for breeding
<b>Impacts</b>	<ul style="list-style-type: none"> <li>• Out-competes native ants, resulting in significant decline of native ant populations</li> <li>• Reduces the dispersal and reproduction of native plants by out competing native ants and eating plant seeds</li> <li>• Preys directly on insects for food</li> <li>• Reduces the abundance of other species such as birds, small mammals, reptiles and amphibians through stinging, competition and predation.</li> <li>• Can infest infrastructure and equipment</li> <li>• Inflicts a painful sting on people, which can cause an allergic reaction. Sting is particularly dangerous for children</li> </ul>
<b>Management Options</b>	Biosecurity is now using <i>Fipromil</i> – a chemical bait mixed in peanut butter to attract ants. When they consume it, it slowly weakens them until they finally die. The target is to kill or get rid of the queen within the colony. The workers will first bring anything such as food to their queen before getting their share. So, with <i>Fipromil</i> (peanut butter bait), the workers will bring it to their queen and when she eats it and dies a sudden death then there is no chance of her producing a replacement queen ant before she dies.

## Pests in Vanuatu

<b>Names</b>	Scientific	<i>Acridotheres tristis</i>
	Common	Indian Mynah, Common Mynah
	Local (Bislama)	Sako
<b>Organism type</b>	Bird	
		
<b>Physical Description</b>	A brown bird with a black head and yellow legs, bill and eye skin. In flight it displays distinct white patches under its wings. Standing height is about 15 cm, length is 23-26 cm	
<b>Habitat</b>	Likes warm to hot climates, parks, gardens and cleared agricultural areas. Can be found near human development.	
<b>Behaviour</b>	It 'struts' rather than walks and is generally not afraid of humans. Roosts communally in large numbers in the evenings	
<b>Distribution</b>	Tanna, Efate, Santo, Malakula	
<b>Country of Origin</b>	Middle East, India and Asia	

<b>How it spreads</b>	Mynahs lay their eggs in tree hollows, in the walls or ceilings of buildings or in the very top of palm trees. They can breed 1 - 3 times in a year with 3 - 6 young per brood. Mating pairs fiercely protect their nests
<b>Impacts</b>	<ul style="list-style-type: none"> <li>• Out-competes native birds by taking over their nests, killing their chicks and destroying their eggs. This results in the decline of native bird species.</li> <li>• Damages and consumes ripening food crops, affecting agricultural productivity and food security</li> <li>• Can carry and spread diseases including parasites and avian malaria</li> <li>• Spreads agricultural weeds</li> </ul>
<b>Management Options</b>	The Department of Environmental Protection and Conservation (DEPC) introduced a control once only in 2012 during the Independence celebrations where a reward was offered to the rural community that killed the most Mynah birds. No other control has been initiated since then to control Mynah birds in Vanuatu.
	

## Pests in Vanuatu


Names	Scientific	<i>Achatina fulica</i>
	Common	Giant African Land Snail
	Local (Bislama)	Afriken Snel
Organism type	Mollusc	



Physical Description	A very large land snail with a reddish-brown shell with pale yellow markings which tapers to a point, usually 5-10 cm long (however can grow up to 20 cm long). Its shell is twice as long as it is wide.
Habitat	Widespread - natural forests, plantations, agricultural areas, shrub land, wetlands, coastland, riparian zones, disturbed areas, urban areas. Often found under logs/ pieces of timber, under vegetation, in compost, on fences, between rocks and on tree roots. Prefers warm tropical and humid climates
Behaviour	Individuals can consume huge amounts of vegetation within a short period of time
Distribution	Efate, Santo, Malakula, Epi, Tanna, Emae
Country of Origin	Coastal East Africa

How it spreads	Has a rapid reproduction rate, lays 100 - 400 eggs at a time. Can quickly spread and take over an area after being introduced. It moves into new countries and regions in cargo – especially shipping containers, pallets and vehicles.
Impacts	<ul style="list-style-type: none"> <li>• Considered one of the most damaging tropical snail pests due to the large quantity of plant material an individual can consume, its hardiness and fast reproduction rate</li> <li>• Feeds on agricultural crops and spreads plant diseases, affecting agricultural productivity and food security</li> <li>• Feeds on native plants causing damage to vegetable gardens.</li> </ul>
Management Options	Vanuatu has brought in another species called <i>Euglandina rosea</i> (rosy wolf snail or cannibal snail). It has been discovered, that although <i>E. rosea</i> has indeed attacked the <i>Achatina fulica</i> but there is worrying evidence that this cannibal snail has caused the extinction of numerous native snails in other countries. It has now become invasive itself. Efforts to control this species are ongoing.

## Pests in Vanuatu

<b>Names</b>	Scientific	<i>Rattus exulans</i> , <i>Rattus rattus</i> , <i>Rattus norvegicus</i>
	Common	Pacific rat ( <i>R. exulans</i> ), Black rat ( <i>R. rattus</i> ), Brown rat ( <i>R. norvegicus</i> )
	Local (Bislama)	Rat
<b>Organism type</b>		Vertebrate
		
<b>Physical Description</b>	<ul style="list-style-type: none"> <li>Black and brown in colour with large round ears and a pointed snout and comparatively small feet. Body is thin and long in size reaching up to 15 cm.</li> <li><i>R. rattus</i> commonly known as the black rat. Has a distinguishing long tail. Skin colour ranges from black to light brown. Adults grow up to 32.4 - 46.4 cm long and may weigh about 110 grams to 340 grams.</li> <li><i>R. norvegicus</i> is brown in colour. It is about 25 cm long from the tip of the nose to the base of the tail. Its tail is as long as its body. Adult male weighs up to 350 grams. Adult female weighs 250 grams.</li> </ul>	
<b>Habitat</b>	<ul style="list-style-type: none"> <li><i>Rattus rattus</i></li> <li><i>Rattus norvegicus</i> prefers moist environment; naturally in or on river banks. Rats found nowadays in sewage systems and damp sites.</li> </ul>	
<b>Distribution</b>	Pacific, black and brown rats are found on all the islands of Vanuatu. In Vanuatu, it has become a real pest.	

<b>Behaviour</b>	<ul style="list-style-type: none"> <li><i>R. exulans</i> feeds on seeds, fruit, leaves, bark, insects, earthworms, spiders, lizards and birds' eggs and hatchlings. Polynesian rats have often been observed taking pieces of food back to a safe place to properly shell a seed or otherwise prepare certain foods.</li> <li><i>R. rattus</i> It is omnivorous, feeding on a wide variety of food, including plants, seeds and nuts, fruit as well as eggs of native birds. <i>R. norvegicus</i> is a gregarious animal, mostly living in groups, playing together, grooming each other, huddling together.</li> </ul>
<b>Country of Origin</b>	<ul style="list-style-type: none"> <li>The <i>Rattus exulans</i> originated in the Indo-Malaysian region.</li> <li>The <i>Rattus rattus</i> originated in tropical Asia. It spread to the near east in Roman times, then to Europe then across the world.</li> <li>The <i>Rattus norvegicus</i> originated in North China. It has spread to all continents except Antarctica.</li> </ul>
<b>How it spreads</b>	The <i>Rattus exulans</i> , <i>Rattus rattus</i> and <i>Rattus norvegicus</i> were unintentionally introduced into Pacific Island countries by people on oceangoing vessels.
<b>Impacts</b>	<ul style="list-style-type: none"> <li>This is copied from the description of the Giant African Snail Considered one of the most damaging tropical snail pests due to the large quantity of plant material an individual can consume, its hardiness and fast reproduction rate</li> <li>Feeds on agricultural crops and affecting agricultural productivity and food security</li> <li>Feeds on native plants causing damage to ecosystems and changes in ecosystem functioning (altered nutrient cycling)</li> <li>Decline of native gastropod species due to competition for food and habitat</li> <li>A threat to both natural habitats and agriculture. Natural habitats because it feeds on native birds. Agriculture because it feeds on agricultural crops including coconut.</li> <li>Carriers of pathogenic organisms</li> <li>Carriers of certain pathogens</li> </ul>
<b>Management Options</b>	<ul style="list-style-type: none"> <li>Trapping</li> <li>Poisoning</li> <li>Proofing</li> </ul>



## Integrated Management Model Options on *Merremia peltata*

There are a number of management options available to farmers and land managers. The option selected may vary from place to place depending on the availability of technical skills and resources, particularly financial resources. Ecological impacts of the management option selected also plays an important role in their selection.

Farmers and land managers with the financial capability may choose herbicides as their management option. Herbicides currently on the market include Weedmaster Duo, Glyphosate, 2, 4-D, 2,4, 5-T, Victoria Gold, Vigilant Gel, and Ultimate.

A herbicide works faster than physical and cultural control. However, herbicides are more expensive and can be hard to access in remote farming islands and communities. They can be detrimental to the ecosystem and the health of the person applying them. Continuous application of herbicides over a long period of time can lead to accumulation of residues in crop plants. The weed species can also build up resistance to them after a while, leading to 'super weeds'. The downstream effect of leached herbicides is another problem where excess herbicides are applied in farms or parks.

For environment conscious farmers and land managers, physical and cultural methods can be used. Hand cutting and weeding are common in most Pacific island countries. The stems and tubers may be uprooted and the whole plant burned or dehydrated in the sun. The weed may be grazed by cattle, small ruminants or horses.

Cultural control is also practised in some parts of Vanuatu. On East Santo, forestry plantations of *Endospermum medullosum* (whitewood) are observed to suppress the *Merremia peltata* once the forest has established a high canopy density. This method involves selective planting of crops or plants that are aggressive or more aggressive than the target weed species. In pasture, farming techniques are applied. For example planting dates are altered to give a head start on the pasture. This ensures that the pasture is well established by the time the weed seeds germinate. A properly carried out pasture management to avoid overgrazing is another cultural practice used by farmers across Vanuatu. Keeping the pasture at a certain height and density will keep weed seeds from germinating and taking over the pasture.

The 'Integrated Approach System' is an alternative. This system has been developed by Live & Learn Vanuatu and is currently being tested on three sites. The system combines physical removal of the weed by cutting, uprooting of the stem and burning of the whole plant followed by agro-forestry. The agro-forestry component combines high value timber tree species with a root crop as groundcover. The root crop (kumala) provides groundcover in the early years until the forest species builds up sufficient canopy to shed off sunlight.

### Prevention is better than cure!

Once weeds and pests are introduced into an area, they are very difficult, expensive and time-consuming to eradicate. Prevention is better than cure! It is far more effective to take measures to prevent their entry into an environment rather than try and manage them once they have already taken hold.





## Section 3:

### The Right Way to Report

#### Environmental Journalism - an overview

In the simplest terms, environmental journalism is defined as communication about the environment. Whilst environmental journalists and communicators use many of the same principles and practices as regular journalists, it is a unique form of journalism - covering environmental issues is different from covering other news topics. Environmental issues are inherently complex, multi-dimensional, and long-term, and this carries uncertainty. Reporters and communicators need to have many skills. They need to be environmentally literate, be able to translate complex scientific information into relatively simple terms for the general public, keep abreast of current environmental issues and developments and be well connected with scientists, experts, governments and other organisations. They are expected to report accurately and concisely about complex issues within short timeframes, and to make them interesting.

Unlike environmental reporting, mainstream media tend to be crisis-oriented and prefer to focus on singular 'one-off' events. They also tend to report on controversial or prominent events which reflect human interests, regardless of how important and relevant they are (or aren't) to the betterment of society and the environment. Generally speaking, mass media rarely attempt to make connections with social, political and cultural issues over long periods

of time, which is a central characteristic of good environmental reporting. These prevailing conditions create unique challenges for the environmental communicator.

Responsible environmental journalism doesn't stop at presenting facts or reproducing a media release put out by the Government or an NGO. A media release may be a good starting point, but it should always be developed further by taking an in-depth approach. This in depth or *critical approach* is one of the defining characteristics of environmental journalism. To take a critical approach means to ask detailed and exploratory questions to analyse underlying and interconnected issues and present some solutions to the problems (Internews, 2012, p. 61). By using this approach, you are more likely to engage people in taking responsibility for problems rather than by just presenting the audience with negative facts and no solutions which leave people feeling bewildered and disempowered.

#### Environmental Journalism in Vanuatu

Vanuatu has a strong culture as *kastom* is built on communal identity (communalism), strong family ties and tribe and village cohesive social networks. People take care of one another and work together. This is the strength and quality feature of the Pacific region. To help each other, we need to know what the problems are and what help is needed.

The media provide a platform for dialogue and can be a vehicle to raise community awareness, participation and responsibility for addressing environmental issues. Its role will become increasingly important as environment and sustainability issues continue to grow as a result of resource depletion, and as people seek to know more about environmental matters. Many people do not know about invasive species issues (or many other environmental issues) and therefore do not know when to recognise a problem and how to address it. The media can play a powerful and important role in helping to address environmental issues.



### Talk Back Radio in Vanuatu

Talk back radio provides accessible media to a number of people across Vanuatu, allowing the community to participate in the dialogue on current issues.

#### Human rights

Invasive species are becoming a threat to our environment across our nation. In our national constitution under chapter 2, part 2: Fundamental Duties (d) it is stated clearly that every citizen has a duty to protect the Republic of Vanuatu and to safeguard its national wealth, resources and environment in the interests of present and future generations.

So this tells us that combating invasive species to save our environment in Vanuatu is everybody's business.

### Common Criticisms of Environmental News Coverage

The media industry is often criticised for its inadequate coverage of environmental issues. This is not because all journalists are inefficient in their jobs. The problems stem from a variety of circumstances such as limited resources and timeframes, limited environmental knowledge amongst staff, a conservative mass media culture and competing stories. However, before we can find solutions to common problems, it is useful to understand them first. The common criticisms of environmental reporting include:

- ❖ Lack of local meaning and context (commonly known as 'Afghanistanism');
- ❖ Confusing story lines with insufficient and unimportant information;
- ❖ One-off event reporting, rather than long-term reporting on issues;
- ❖ Crisis reporting – presenting environmental issues in an exaggerated way which portrays them as worse than they actually are;
- ❖ Stories that don't make necessary connections, particularly to local communities;
- ❖ Inaccurate reporting on science;
- ❖ Heavy reliance on media releases as the main source of information;
- ❖ Simplifying issues too much and only concentrating on one element of the story which holds the most entertainment value;
- ❖ No inclusion of solutions or actions that people can take to help.

### Unique Challenges for Environmental Journalists

The challenges for any journalist are great. However, as was touched upon in the previous section, the challenges for environmental journalists are often greater. Journalists and communicators who cover environmental issues are faced with unique problems and issues. They must:

- ❖ Translate technical, complex and multi-dimensional scientific information into clear, concise and easy to understand form, whilst being careful not to miss important facts or points;
- ❖ Thoroughly investigate complex background information, often when the required information is hard to come by;
- ❖ Work across a number of disciplines and often deal with large volumes of information. The environmental field is broad and complex, environmental communicators must deal with a range of fields of study e.g. ecology, waste, chemical and industrial pollution, sustainability, water issues, land degradation, forestry, agriculture etc.;
- ❖ Connect issues to their ecological, social and political consequences at local, national and global levels;
- ❖ Operate within an industry which has entrenched values and structures that subconsciously work against the needs of environmental reporting. These include conservative management/editors, private interest advertising pressures and the dominance of stories that align to what is considered newsworthy;
- ❖ Develop stories when often they have had little or no training/education on environmental issues. Journalists often get moved from topic to topic, depending on editor requests;
- ❖ Present issues which carry uncertainty or risks and which have not reached consensus among the scientific community – it is difficult to present good engaging stories which are bound by these conditions;
- ❖ Produce stories with limited resources such as internet access, vehicle transportation and small budgets (particularly challenging for developing nations);
- ❖ Compete with other breaking news stories, which often sideline environmental reports;
- ❖ Risk the professional and personal repercussions of reporting on controversial issues and face government censorship;
- ❖ Do all of this within tough time and resource constraints.

Thankfully, there are a range of realistic measures that journalists and communicators in Vanuatu can take to help mitigate some of these challenges, which are presented in the next section.

## Principles of Good Journalism

The media industry is powerful. It has significant and unique power in influencing popular public knowledge and opinion on issues. It chooses what information to provide, provides the information in a manner it sees fit and comments on topical issues. It is the medium by which most people gain knowledge about the world round them, and is certainly the medium by which most people gain knowledge about environmental issues. As such, the media have an ethical responsibility to use their power for social betterment. Being a journalist is a privilege. As part of the media industry, you as a journalist or communicator hold some of the power. But with power comes responsibility and part of your responsibility, therefore, is to adhere to a high standard of principles and practices to achieve the best outcome for society and the environment.

### Core Guiding Principles

There are a myriad of media codes and guidelines that exist around the world today to help guide journalists to do their work with integrity. This section aims to condense these guidelines into a concise and readable framework. Most journalism guides/publications point to the following broad guiding principles, in one way or another (Internews, 2012, P. 64):

- ◆ Truth;
- ◆ Accuracy;
- ◆ Independence;
- ◆ Fairness;
- ◆ A commitment to minimise harm.

More specifically, good journalistic practice (Sources: Internews, 2012, p. 65; IFJ (code of ethics) and the news manual) should also:

- ◆ Expose crime and corruption;
- ◆ Make governments work better;
- ◆ Promote open debate;
- ◆ Distinguish between facts and opinion;
- ◆ Be balanced and objective;
- ◆ Avoid exaggerating facts;
- ◆ Be objective and impartial;
- ◆ Explain the impact of events (for environmental issues, this means: ecological, social and economic impacts);
- ◆ Be inclusive;

- ◆ Respect people's privacy;
- ◆ Promote the values of freedom of expression and information;
- ◆ Present information in 'good taste';
- ◆ Uphold the high ethical standards that the profession demands.

### Codes of Conduct

The International Federation of Journalists (IFJ) is the world's largest organization of journalists. The IFJ's mission is to promote international action to defend press freedom and social justice through strong, free and independent trade unions of journalists. The IFJ has produced the 'Declaration of Principles on the Conduct of Journalists', which is fully presented in Appendix 2, or is available at: [www.ifj.org/en/pages/about-ifj](http://www.ifj.org/en/pages/about-ifj)

Vanuatu also has its own journalist's code of ethics, 'Vanuatu Media Code of Ethics and Practice', which frame international journalism standards in the local context. The full code is presented in Appendix 3, and it can be found online at: [www.mav.org.vu/welkam/media-code-of-ethics-and-practice](http://www.mav.org.vu/welkam/media-code-of-ethics-and-practice).

## Practical Guide to Environmental Journalism

### The Six Key Questions

Regardless of the topic, your story should answer six key questions (Source: Internews, 2012, 'Speak Up, Speak Out, p. 83', the news manual, ch. 6):

1. **Who:** the people involved in the story.
2. **What:** events or actions that took place.
3. **When:** time frames.
4. **Where:** physical location.
5. **Why:** reasons.
6. **How:** further details relating to 'what'.

### Sources of Information

Getting good sources of information is important to journalists. Journalists can try and make their own observations about an issue or event but all good stories are supported by a range of reliable sources. Sources are any resources which help journalists to compose stories. They include people/interviews, the internet, research papers, media releases and other journalists.

Primary information sources are the people at the centre of an issue who can provide you with information. They are usually one of the best information sources to go to and can give you a unique insight into the issue which others can't. For example, the operator of a scuba diving company whose business is declining from damage to the reef caused by Crowns-of-Thorn starfish is a good primary information source. Primary information sources for invasive species are likely to include:

- ❖ Farmers and landholders;
- ❖ Tourism industry representatives;
- ❖ Naturalists;
- ❖ Official sources and spokespeople e.g. the government, experts;
- ❖ Activists and NGOs.

Accessing primary information often means interviewing someone. For environmental journalism, the same rules apply for interviewing as with standard reporting:

- ❖ Do your background research and prepare some questions before the interview. More questions will inevitably arise as the interview starts but it pays to be reasonably prepared.
- ❖ Make friends with your interviewee so you can get the most out of them. This may mean meeting in an informal setting such as a coffee shop or in their own space (e.g. their office). It may also mean that you engage in some 'small talk' before getting down to business. Ask the hard questions, but ask them at the end of the interview.
- ❖ Phrase your questions so they are polite, sensitive and intelligent. You will gain respect from the interviewee if you can show that you know what you are talking about.
- ❖ Listen to what the interviewee has to say and make sure you understand what they mean. You need to be able to visualise the complete story as they describe it.
- ❖ Evaluate (in your head) the things you are hearing during the interview and after the interview. Is the information newsworthy? Is it accurate? Are there any hidden agendas? How does it relate to secondary information? Are they a competent observer?
- ❖ Wear appropriate clothing for the interview, especially if you are entering a cultural or religious area.
- ❖ Avoid using language that is offensive to the interviewee.
- ❖ Act confidently and professionally.

- ❖ Recap on the story at the end of the interview to make sure you have all the facts and figures correct. You can do this by checking over your notes (again, in your own head) whilst talking with the interviewee about something else.

Research reports can also be good primary information sources. Research reports are usually only published after they have been checked thoroughly by authors and have been through a peer review process. Make sure you check the following with your publications:

- ❖ Check the date of publication. Is it reasonably current?
- ❖ Who is the author and what are their qualifications? Are they an expert? Where do they work and who are they funded by?
- ❖ Who published the report? Are they a reputable organisation? Journals and publications from scientific bodies are usually reliable and reputable.
- ❖ How was the information produced? Surveys, interviews or government research?
- ❖ Are there any risks to using the information? Can it harm anyone? Is it essential to the story?
- ❖ What are the agendas of the people producing the information? Are there any likely biases?
- ❖ Are there any NGOs or researchers who can help you understand the published reports and the methodology used?

Secondary sources of information help to back-up and verify what primary sources are saying. They are particularly important for environmental reporting as they help to reveal the many dimensions involved within one story. They are also useful for background research before you conduct your interview. Journalists are busy and often have limited time. If you have access to the internet, do a search on the topic or issue. Use the websites listed at the back of this book to help you get started, or do a 'Google' search for the topic. Secondary sources can include (Internews, 2012, *Speak Up Speak Out*, p.84 – 86, the news manual):

- ❖ Research reports;
- ❖ Archives;
- ❖ Internet;
- ❖ Books;
- ❖ Newspapers and other media;
- ❖ Official records, reports and documents; and
- ❖ Media releases.

## Suggestions for Better Environmental Reporting

As we have learnt, environmental journalists and communicators face unique challenges. However there are a number of realistic practices and techniques (as listed below) which can help them to overcome these challenges. In the beginning, you will find it challenging to ensure that your story covers these points. Over time and with dedicated practice, however, you will find that your stories move more towards encompassing these techniques.

**Language** - translate scientific jargon into clear simple language that your audience will understand. Don't assume people know what technical words and concepts mean. Define and explain all technical words. Remember, your job is to be the 'bridge' between your audience and the scientific community. This is one of the most challenging aspects of environmental reporting.

**Basic knowledge** - As an environmental communicator, it is wise to build up your basic knowledge about the environment, as well as the specific issue that you are reporting on. This means understanding basic ecological processes and being aware of the most important environmental issues in Vanuatu and beyond. This will help you to uncover more of the issue, gain a more balanced perspective to do your job more efficiently. Attend any training sessions you can to improve your environmental knowledge and literacy and get out of the office and into the field. These may include workshops, seminars, courses, community talks etc. Read widely and regularly.

**Information** - Use an array of credible information sources (including information from NGOs, experts and universities) to develop your stories. Avoid relying heavily on government media releases. Alternatively, you can report on reports released by research organisations (e.g. universities, the United Nations, SPREP). Be extra careful with quoting statistics - some statistics are deliberately constructed to be misleading. Find new information sources regularly, including locally relevant social forums (e.g. online blogs, volunteer groups) where people are discussing topical issues.

**Issues** - Report on issues that are most significant to the local community and the environment. Avoid presenting only the trivial or controversial stories. Accept that science is generally slow, incremental and rarely has 'breaking news' (although breakthroughs do occur sometimes).

**Systems Thinking** - Think like an ecologist and look for connections and effects. What are the social and economic links or consequences to your story? What is the human angle? Remember the interdisciplinary nature of environmental reporting - health, culture, science, communities, business and industry, ecology, risks and hazards all connect. They cannot be separated from each other.

**Critical Approach** - Approach each story with a healthy degree of professional scepticism. Be careful of propaganda and self-serving interests, which can lie beneath seemingly straightforward stories. Examine claims critically, looking at all possibilities and scenarios. Ask a lot of questions that require explanations, not just 'yes' or 'no' responses. Check to see if media releases actually contain newsworthy information. Media releases can contain propaganda and manipulate the environmental agenda. Provide practical and achievable solutions to problems.

**Objectivity** - Be as balanced as you can in your presentation of the story and try not to impose your own values, but make a stand in the end and raise questions for future follow-ups.

**Accuracy** - You must report on science accurately and report the whole story, not just the bits that will create more of a 'buzz'. Accuracy underpins modern science. Thoroughly research and understand the topic before starting to write your story. Do not make misleading statements and don't report on things you don't understand. Don't make sensationalist and inaccurate claims as these tarnish the reputation and authenticity of science. Check your facts and figures and try and consult with at least two experts so you can verify facts. This may be challenging in a relatively small country like Vanuatu, where there may not be a large pool of experts. In this case, you may choose to consult with NGOs or government officers instead (e.g. agricultural extension officers).

**Interest** - Try to keep your story interesting and unique - a challenge for science reporting! Create new angles by localising the issues and creating links where they have not been made before.

### Story angles for reporting on invasive species

- ❖ Link invasive species issues to wider issues that are more human-centred. For example, you can make links to food security, community health and employment rather than just focussing on impacts to the natural environment.
- ❖ Interview local people involved in affected industries e.g. agriculture and tourism workers.
- ❖ Report on local success stories - environmental reporting has historically been mostly 'doom and gloom', which becomes boring and predictable after a while.

**Audience** - Understand the needs of your audience well and anticipate their concerns, questions and desires. What's the general level of environmental awareness in the community? What are their interests and needs? What angle do you need to take to engage them in your story?

**Start Local** – Try presenting stories starting from a local community context first. Then, link them to national and/or global events or issues.

**Context** – Your story should have a human angle. That is, it should be relevant and of interest to people's everyday lives. This can be achieved by using local case studies, personalising issues, using metaphors and similes and by providing the local history of an issue. Don't frame the story in a catastrophic or alarmist manner, this will only disempower people and move ownership of the issues away from local communities into distant governments and organisations. You need to give people some solutions to the problems, or steer them in a direction where they can get help.

### Reporting tip

Using metaphors and similes is a great way to add some context and creativity to your environmental reporting. Here are some examples:

- ❖ Every weed that is removed from the ground is a win for the war on weeds (metaphor).
- ❖ The ozone layer is like a big greenhouse (simile).
- ❖ Weeds and pests are the evil rulers of our ecosystems (metaphor).
- ❖ Big Leaf Rope is an aggressive vine which chokes out native vegetation (metaphor).
- ❖ Indian Mynah Birds strut around parks and gardens like school yard bullies, scaring off all of the native birds that cross their paths (simile).

Report on local success stories – environmental reporting has historically been mostly 'doom and gloom', which becomes boring and predictable after a while. **Internal Structures** - Try to set aside a dedicated environmental reporter on your team, if resources allow for one. Consider creating a dedicated environmental news page or report session as part of your regular news coverage to achieve some consistency.

**Coverage and Follow-Ups** – Environmental issues are by nature long-term. Give environmental issues the attention they deserve by making sure your coverage is consistent and by doing regular follow-up stories on important issues.

**Prepare** - Prepare well. Environmental issues are complex and detailed. Doing enough preparation so that you feel comfortable with the subject matter is the key to a successful story.

**Uncertainty and Risk** – Part of environmental reporting is communicating the uncertainty and risks that most environmental issues carry, rather than leaving them out because it's too confusing. Be prepared to report on issues where scientists disagree or that have inconclusive results, however, do this with caution. You need to communicate risks but you don't want to create unnecessary alarm. Providing practical solutions will help.

**Networks** – Build professional connections with scientists and experts. These people can give you background information, ideas for stories and links to others. You may have to work on building trust between the scientific community and yourself (many scientists have had bad experiences with journalists reporting inaccurately or sensationalising issues).

**Sustainability Ethic** – Should you frame your stories with a sustainability ethic? That is, should you become an environmental advocate through your journalism? Traditional journalistic literature says that journalists should report on the facts and remain as objective as possible. However there is a smaller body of thought that supports journalists approaching each story with a sustainability ethic in mind. This means presenting your story in a way which sympathises with the sustainability cause and offers solutions which empower people to act in a way which creates a better environment and society. This guide stops at providing a recommendation either way on this issue. However it does suggest that you discuss this issue with management in your organisation, and then move forward from there.

Even if, as a journalist, you do manage to work according to these guidelines, you will still be likely to be constrained by the organisational framework within you work. This guide cannot solve the organisational, structural and cultural barriers to environmental reporting that exist within the media industry. Managers, editors and board members all have a significant influence over what and how stories are produced. These barriers will take a long time to change and the efforts will have to come from many directions.

## Big Lif Rop

### What history tells us

One good way to build knowledge on an issue and make it more meaningful to communities is to revisit local history. This is a story from Green Hill community, north of Tanna, Tafea Province as told by Ken Bob.

*"Big leaf rope was believed to be introduced into Tanna in 1942 during World War II. It was firstly introduced by the Americans for camouflage purposes on Efate. Certain Tannese people who travelled to Efate brought it back with them to Tanna, thinking that it was a new vine and wanting to have it grown on their home Island. This was how the vine was introduced in Green Hill, northwest of Tanna.*

*Every year, the Tannese have this special ceremony of circumcision that takes place from May to September. Because this particular ceremony is a special and important one in the community, it usually takes place after the harvest of yams in the month of April. So during the ceremony we have this big pudding that we put in earth ovens that everybody attending the ceremony can share, after the kids have been circumcised, weaned and released from the nakamal back into the communities to join their families. These puddings are quite huge and needed ropes to tie them up before placing them in the earth oven. The communities use big leaf ropes to tie these puddings. However, since the vine is several kilometres away from Green Hill Village, the community members have to walk many kilometres to get these vines. After regular occurrences of walking long distances, an old lady from the community thought it was better to grow the vines near their village which would make them accessible to all. So she brought the vine and planted it close to the community. Today it has become invasive and is killing our trees. Especially now that we have a conservation area, the vine just smothers the trees there and destroys their shelter and food for the wildlife.*

*Now all we want to do is to get rid of the vine and we would really appreciate it if we could all work together to control it, or more importantly eradicate it, as we could always use other vines that are not that aggressive like big leaf rope for our puddings".*



## Section 4:

### Directory

This section contains important dates, information and contacts if you are looking to expand your knowledge on invasive species and general environmental awareness beyond this media guide.

### Important Dates

- ❖ UN Decade on Biodiversity (2011-2020)
- ❖ World Wetlands Day – 2nd February
- ❖ World Forestry Day – 21st March
- ❖ World Water Day – 22nd March
- ❖ Earth Hour – 23rd March
- ❖ World Heritage Day – 18th April
- ❖ Earth Day – 22nd April
- ❖ World Migratory Bird Day – Second weekend of May
- ❖ International Day for Biological Diversity – 22nd May
- ❖ World Environment Day – 5th June
- ❖ World Habitat Day- 1st October
- ❖ World Fisheries Day - 21st November

## Further Reading

### Books

- ❖ Day, B. & Monroe, M.C. (Eds.), 2000, *Environmental education and communication for a sustainable world: Handbook for international practitioners*, Washington, D.C.: Academy for International Development.
- ❖ Environmental Health Center, 1998, *Coastal challenges: A guide to coastal and marine issues*, Washington D.C.: National Safety Council.
- ❖ Environmental Journalism Center (1999). *Covering key environmental issues: A handbook for journalists* (4th Ed.), Washington, D.C.: Radio-Television, News Directors Foundation.
- ❖ Friedman, S. & Friedman, K, 1988, *Reporting on the environment: A Handbook for journalists*. Bethlehem, PA: Department of Journalism and Communication, Lehigh University.
- ❖ GreenCom and Academy for Educational Development, 2002, *Environmental Education & Communication for a Sustainable World: Handbook for International Practitioners*. Available online: [www.greenbiz.com/research/tool/2002/06/09/environmental-education-communication-sustainable-world-handbook-internatio](http://www.greenbiz.com/research/tool/2002/06/09/environmental-education-communication-sustainable-world-handbook-internatio) (accessed 04/01/2013).
- ❖ Hanson, A., 2010, *Environment, Media and Communication*, Taylor and Francis.
- ❖ Kamrin, M.A., Katz, D.J., & Walter, M.L., 1995, *Reporting on risk: A journalist's handbook on environmental risk assessment*. Michigan: Foundation for American Communications and National Sea Grant College Program.
- ❖ Keating, M., 1993, *Covering the environment: A handbook on environmental journalism*, Ottawa: National Round Table on the Environment and the Economy.
- ❖ LaMay, C.L. and Dennis, E.E. (eds), 1991, *Media and the Environment*, Freedom Forum Media Studies Centre, USA.
- ❖ Logan, R., Tessier, M. and Christiansen, S., 1995, *Environmental Issues for the '90s*, The Media Institute.
- ❖ Nelson, P., 1995, *Ten practical tips for environmental reporting*, Washington D.C.: International Center for Journalists.
- ❖ Prato, L., 1991, *Covering the environmental beat: an overview for radio and TV journalists*, Washington, DC: Environmental Reporting Forum.

- ❖ Trzyna, T. C., Margold, E. and Osborn. J.K., 1996, *World Directory of Environmental Organisations: A handbook of national and international programmes – government and non-government – concerned with protecting the Earth's resources*, International Centre for Environment and Public Policy, California.
- ❖ West, B.M, Lewis, M.J., Greenberg, M.R., Sachsman, D.B., & Rogers, R.M., 2003, *The reporter's environmental handbook* (3rd Ed.), New Brunswick: Rutgers University Press.
- ❖ Wyss, B., 2008, *Covering the Environment: How Journalists Work the Green Beat*, Routledge, UK and New York.
- ❖ A. Tapisuwe, 2001, *Invasive Pest Species in Vanuatu*, Island Construction, Communities in Vanuatu

### Journals

- ❖ Environmental Communication: A Journal of Nature and Culture (Official journal of the International Environmental Communication Association).

### Websites

#### Invasive Species:

- ❖ Secretariat of the South Pacific Regional Environment Programme (SPREP) - Invasive Species Programme [www.sprep.org/Invasive-Species/bem-invasive-species](http://www.sprep.org/Invasive-Species/bem-invasive-species)
- ❖ Pacific Invasives Learning Network (PILN) [www.sprep.org/Pacific-Invasives-Learning-Network-PILN/piln-welcome](http://www.sprep.org/Pacific-Invasives-Learning-Network-PILN/piln-welcome)
- ❖ Pacific Invasives Initiative - <http://www.issg.org/cii/PII/index.html>
- ❖ Global Invasive Species Information Network [www.gsin.org](http://www.gsin.org)
- ❖ Pacific Island Ecosystems at Risk [www.hear.org/pier](http://www.hear.org/pier)
- ❖ UN Invasive Species Specialist Group [www.issg.org](http://www.issg.org)

#### Journalism:

- ❖ Media Asosiesen blong Vanuatu [www.mav.org.vu](http://www.mav.org.vu)
- ❖ The News Manual [www.thenewsmanual.net](http://www.thenewsmanual.net)
- ❖ Project for Excellence in Journalism [www.journalism.org](http://www.journalism.org)
- ❖ Pacific Islands News Association [www.pina.com.fj](http://www.pina.com.fj)
- ❖ Commonwealth Journalists Association [www.commonwealthjournalists.org](http://www.commonwealthjournalists.org)
- ❖ Society of Environmental Journalists [www.sej.org](http://www.sej.org)
- ❖ International Environmental Communication Association [www.theieca.org](http://www.theieca.org)

## Support networks within Vanuatu

### Department of Environmental Protection and Conservation

#### Responsibilities

Coordinates the Global Environmental Funds-Pacific Alien Species Invasive Alien Species (GEF-PAS IAS) project activities.

The GEF-PAS IAS under the department of Environment focuses on *Merremia peltata*, African tulip, Wild peanut and Lantana camara.

#### Contact Details

- ◆ Donna Kalfatak: [dkalfatak@vanuatu.gov.vu](mailto:dkalfatak@vanuatu.gov.vu)
- ◆ Lilly Fatdal: [lfatdal@vanuatu.gov.vu](mailto:lfatdal@vanuatu.gov.vu)
- ◆ P.M.B 9063, Port Vila, Vanuatu
- ◆ Tel: +678 25302 or 33403
- ◆ <https://mol.gov.vu/index.php/en/others/environment>

### Department of BioSecurity

Coordinates the weed management project focusing on Agricultural weed managements by introducing bio-control of each targeted species including Water Hyacinth, Water Lettuce, Broom weed, Mile a minute, Lantana camara, Cat's claw creeper, *Sida acuta*, *Mimosa diplotricha*.

- ◆ Sylverio Bule: [bsylverio@vanuatu.gov.vu](mailto:bsylverio@vanuatu.gov.vu)
- ◆ P.M.B 9095, Airport Road, Port Vila, Vanuatu
- ◆ Tel: (+678) 23130 / 23519
- ◆ <http://www.malffb.gov.vu>

### Department of Agrculture & Rural Development

- ◆ Airport Road, P.M.B 9040, Port Vila, Vanuatu
- ◆ Tel: (678) 33550 / 22432 / 22525
- ◆ [agriculturestaff@vanuatu.gov.vu](mailto:agriculturestaff@vanuatu.gov.vu)
- ◆ <http://www.malffb.gov.vu>

### Department of Forestry

The Department of Forestry does not have a specific project to target Invasive Species but encourages the use of Agro-Forestry. Agro-Forestry, the practice of planting tree and crop species in the same plot, does not specifically target invasive species but is central to Live & Learn's current approach of managing *Merremia peltata* (Big Leaf Rope).

- ◆ Philemon Ala: [pala@vanuatu.gov.vu](mailto:pala@vanuatu.gov.vu)
- ◆ Ann Marie Sarisets: [anne\\_sarisets@yahoo.com.au](mailto:anne_sarisets@yahoo.com.au)
- ◆ [forestry@vanuatu.gov.vu](mailto:forestry@vanuatu.gov.vu)
- ◆ Airport Road
- ◆ Private Mail Bag 9064, Port Vila, Vanuatu
- ◆ Tel: +678 5333460 / 33750 / 23171
- ◆ <http://forestry.gov.vu/>

### Department of Fisheries

Focuses on marine species such as the crown of thorns, black sea urchins and any other marine species found in Vanuatu waters.

- ◆ Kalna Arthur Arthur: [karthur@vanuatu.gov.vu](mailto:karthur@vanuatu.gov.vu)
- ◆ Javen Ham: [jayven04@gmail.com](mailto:jayven04@gmail.com)
- ◆ P.M.B 9045, Port Vila, Vanuatu
- ◆ Tel: +678 23119 or 23621
- ◆ [ContactFisheries@vanuatu.gov.vu](mailto:ContactFisheries@vanuatu.gov.vu)
- ◆ <http://fisheries.gov.vu/>

### Live & Learn Vanuatu

Focuses on the control of *Merremia peltata* (Big leaf rope)

- ◆ Jessie Kampai: [jessie.kampai@livelearn.org](mailto:jessie.kampai@livelearn.org)
- ◆ P O Box 1629, Port Vila, Vanuatu
- ◆ Tel: +678-27455
- ◆ [vanuatu@livelearn.org](mailto:vanuatu@livelearn.org)
- ◆ [www.livelearn.org](http://www.livelearn.org)





# Frequently asked questions

## Q. What is an invasive species?

Invasive species are plants or animals that expand and thrive in an area and are not welcomed. They cause serious harm to the natural environment, communities and the economy.

## Q. How did they arrive in Vanuatu?

Most invasive species originate from outside Vanuatu. They arrived in Vanuatu either accidentally or deliberately via a number of ways including: in cargo and luggage from boats and aeroplanes, introduction by governments as biological control agents and others for ornamental purposes.

## Q. What are the most problematic invasive species in Vanuatu?

The most common weeds in Vanuatu include: Big Leaf Rope (*Merremia peltata*), Mile-a-minute (*Mikania micrantha*), Tora (*Cassia tora* or *Senna tora*) and Giant Sensitive Plant (*Mimosa diplotricha*).

The most problematic pest species include: Indian Mynah Birds (*Acridotheres tristis*), Giant African Land Snails (*Achatina fulica*) and Fire Ants (*Solenopsis invicta*).

## Q. Where do they occur?

Invasive species are widespread in Vanuatu. They are believed to occur on almost every island of the archipelago.

## Q. Why are they a problem?

Invasive species are a problem because they cause damage to ecosystems, biodiversity, agriculture, local food security, businesses and industry. They do this by competing with and destroying native species, ecosystems and agricultural crops.

## Q. I'm a farmer, what can I do about invasive species?

Where possible, immediately eradicate or manage the invasive species to keep it from spreading.

If new species occurs, report occurrence/sighting to the Department of Biosecurity, Phone: 23519, Tagabe, Port Vila

Seek advice from the experts: Biosecurity, Department of Environment, Department of Forests, Department of Agriculture and Rural Development, Department of Livestock, NGOs like Live and Learn Vanuatu.

## Q. I'm not a farmer, what can I do about invasive species?

Report occurrence/sighting to relevant government authorities or NGO groups

## Q. I'm not a farmer, what does it have to do with me?

Even if you are not a farmer or land manager, invasive species impacts can still affect you indirectly. Vanuatu's economy – which affects everyone - relies heavily on agriculture and tourism. Invasive species present direct and very real threats to the agriculture and tourism industries.


## Q. Who can I contact for more information and assistance?

See section 4

Please refer to table on page 59, section 4 to see all the contact details of each of the respective organisations that are dealing with Invasive Species in Vanuatu.

Department of Biosecurity, Department of Environmental Conservation and Protection, Department of Forestry, Department of Agriculture and Rural Development, Department of Livestock and non government organisations (NGO's) like Live and Learn Vanuatu.

# Glossary

Word	Bislama 	Definition
Abiotic		Physical and chemical environmental factors that are non-living e.g. soil, temperature, moisture.
Agroforestry		A mixed land management/ agricultural method which uses trees in combination with cropping and livestock.
Aquatic Ecosystems		Ecosystems which exist within water, e.g. rivers, coral reefs, deep oceans.
Biodegradable		Matter which can be broken back down into its original compounds through natural decomposition processes carried out by living organisms (usually microbes).
Biodiversity		The variety and abundance of all plants and animals that live on the planet or within a specified area.
Biological control agent		A method of managing invasive species which uses other living organisms, such as a disease or an insect, as the control agent.
Biotic		Biological/living environmental factors, for example, native plants, invasive pests.
Deforestation		The process of cutting down, removing and burning trees and other vegetation types.

Word	Bislama	Definition
Ecosystem		The relationships and interactions between the living and non-living things (e.g. soil, water) of a particular area.
Ecosystem services		The essential resources and processes that the natural world provides to humans and animals for their survival. For example, plants provide oxygen, wetlands filter polluted water.
Endemic species		Plants and animals that naturally and only occur in a particular environment or ecosystem.
Environmental weeds		Weeds that invade native ecosystems and adversely affect the health of native flora and fauna.
Erosion		Loss of the soil surface faster than it can be replaced by natural soil forming processes. This leads to degradation of the land, pollution of rivers and sometimes landslides.
Eutrophication		The process where excess nutrients are washed into waterways causing plants to grow at abnormally fast rates, causing issues such as algal blooms and reduced dissolved oxygen in the waterway.
Extinct		Groups of animals or plants that have all died out and there is no representative of their species left alive anywhere.
Food security		A nation's or a community's ability to ensure it has on-going access to enough nutritious food to keep its population healthy and active into the future.

Word	Bislama	Definition
Habitat		The home of a plant, animal and other living things, for example, in a tree, on a coral reef.
Herbicides		Chemicals that are applied to weeds to kill them, for example, Glyphosate.
Insect		An invertebrate with six legs and three body parts – an abdomen, thorax and head.
Integrated pest/weed management		A sustainable approach to managing invasive species which uses an appropriate mix of biological, chemical and physical methods to control and manage invasive species.
Invasive species		Plants or animals that expand and thrive in an area where they are not wanted, causing significant harm to the natural environment, communities and the economy.
Invertebrates		Animals without a backbone, for example, spiders, ants, mosquitoes.
Land degradation		The decline in health of a landscape through one or more factors which may include deforestation, soil erosion, overstocking, slash and burn agricultural technique and pest/weed invasions.
Mollusc		A type of invertebrate animal with a muscular foot, for example, snail.
Native species		See endemic species.

Word	Bislama	Definition
Nutrient cycle		The conversion of nutrients in an ecosystem from the physical environment (e.g. the soil) into living organisms (e.g. plants) and then back into the physical environment (e.g. decomposition).
Pesticide		Chemicals that are used to kill or repel pest animals.
Pest		An unwanted animal species, usually non-native, which damages communities, the natural environment and the economy.
Photosynthesis		The process where plants absorb carbon dioxide and convert it to sugars (plant food) using the sun's energy.
Reforestation		Replanting trees and forests or allowing the forest to grow back naturally where previously it was degraded by activities such as farming, deforestation or natural disasters.
Riparian zone		The strip of land and vegetation that is located adjacent to waterways.
Ruderal species		Weeds that colonise and spread after an area has been disturbed, e.g. after land clearing, slash and burn agricultural technique or a cyclone, for example, <i>Merremia peltata</i> .
Run-off		Water flow that occurs over a catchment area when soil is completely saturated, a normal part of the water cycle.

Word	Bislama	Definition
Siltation		When soil particles are washed into rivers and other waterways causing them to become cloudy or turbid.
Slash and burn agricultural technique		The clearing, burning and cultivating of the land to make food gardens.
Sustainable agriculture		An alternative farming practice that attempts to balance the needs of farmers and their families with conserving the natural environment. It involves practices such as agroforestry which helps maintain soil fertility and structure.
Sustainable development		Development that meets the needs of the current population without compromising the ability of future generations to meet their own needs.
Threatened species		Plants or animals which are at risk of becoming extinct
Transpiration		The loss of water vapour from plants through their leaves. This is a part of the evaporation process within the water cycle.
Vertebrates		Animals with a backbone, for example, fish, pigs.
Weed		An unwanted plant species which damages communities, the natural environment and the economy.
Wetland		A type of environment which is either permanently or temporarily inundated with water.

## References

- ❖ Fosberg and Sachet, 1997; p.27, *Merremia peltata* (PIER species info), [hear.org/pier/species/Merremia\\_peltata.htm](http://hear.org/pier/species/Merremia_peltata.htm)
- ❖ Stone, 1970; p.496, *Merremia peltata* (PIER species info), [hear.org/pier/species/Merremia\\_peltata.htm](http://hear.org/pier/species/Merremia_peltata.htm)
- ❖ Smith, 1991; p.49-50, *Merremia peltata* (PIER species info), [hear.org/pier/species/Merremia\\_peltata.htm](http://hear.org/pier/species/Merremia_peltata.htm)
- ❖ Waterhouse & Mitchel, 1998; p.27-28, *Mikania micrantha* (PIER species info), [hear.org/pier/species/Merremia\\_peltata.htm](http://hear.org/pier/species/Merremia_peltata.htm)
- ❖ Whistler, 1983; p.68, *Solanum torvum* (PIER species info), [hear.org/pier/species/Solanum\\_torvum](http://hear.org/pier/species/Solanum_torvum)
- ❖ Wagner et al., 1999; p.700, *Senna obtusifolia* (PIER species info), [hear.org/pier/species/senna\\_obtusifolia.htm](http://hear.org/pier/species/senna_obtusifolia.htm)
- ❖ Holm et al., 1997; p.332, *Mimosa pudica* (PIER species info), [hear.org/pier/species/mimosa\\_pudica.htm](http://hear.org/pier/species/mimosa_pudica.htm)
- ❖ Stone, 1970; p. 415, *Sida acuta* (PIER species info), [hear.org/pier/species/sida\\_acuta.htm](http://hear.org/pier/species/sida_acuta.htm)
- ❖ Ruben Bakeo & Francis Qarani, FAO report, 2005
- ❖ Plataforma SINC, 2009
- ❖ Pacific Island Ecosystems at Risk [www.hear.org/pier](http://www.hear.org/pier)
- ❖ Media Association blong Vanuatu [www.mav.org.vu/welkam/media-code-of-ethics-and-practice](http://www.mav.org.vu/welkam/media-code-of-ethics-and-practice).
- ❖ Media & Journalism codes of ethics, viewed 14 March 2014, [en.wikipedia.org/wiki/journalism\\_ethics\\_and\\_standards](http://en.wikipedia.org/wiki/journalism_ethics_and_standards)

# Annex

## International Federation of Journalists Declaration of Principles on the Conduct of Journalists.

This international Declaration is proclaimed as a standard of professional conduct for journalists engaged in gathering, transmitting, disseminating and commenting on news and information in describing events.

1. Respect for truth and for the right of the public to truth is the first duty of the journalist.
2. In pursuance of this duty, the journalist shall at all times defend the principles of freedom in the honest collection and publication of news, and of the right of fair comment and criticism.
3. The journalist shall report only in accordance with facts of which he/she knows the origin. The journalist shall not suppress essential information or falsify documents.
4. The journalist shall use only fair methods to obtain news, photographs and documents.
5. The journalists shall do their utmost to rectify any published information which is found to be harmfully inaccurate.
6. The journalist shall observe professional secrecy regarding the source of information obtained in confidence.
7. The journalist shall be aware of the danger of discrimination being furthered by the media, and shall do the utmost to avoid facilitating such discrimination based on, among other things, race, sex, sexual orientation, language, religion, political or other opinions, and national or social origins.
8. The journalist shall regard as grave professional offences the following:
  - ◆ Plagiarism;
  - ◆ Malicious misrepresentation;
  - ◆ Calumny, slander, libel, unfounded accusations;
  - ◆ Acceptance of a bribe in any form in consideration of either publication or suppression.

9. Journalists worthy of the name shall deem it their duty to observe faithfully the principles stated above. Within the general law of each country the journalist shall recognise in professional matters the jurisdiction of colleagues only, to the exclusion of every kind of interference by governments or others."

(Source: *International Federation of Journalists, 2003*)

## Vanuatu Media Code of Ethics and Practice

### 1. ACCURACY, BALANCE AND FAIRNESS

- a. Report and interpret news stories honestly, striving for accuracy, fairness and disclosure of all essential facts. Do not suppress significant available facts or give distorting emphasis.
- b. If a significant inaccuracy, misleading or distorted statement is published it must be corrected promptly and, where appropriate, an apology given?
- c. Media must distinguish clearly between the news, comment, conjecture, fact and paid advertising.
- d. Media organizations are free to be partisan. Each has a duty to be balanced and fair in their treatment of news and current affairs and their dealings with members of the public.
- e. Editorial comment in any medium must be clearly identified as such and kept physically separate from news reports.
- f. Journalists should avoid personal interest, belief, commitment or perceived benefit to sway accuracy, fairness or journalistic independence.
- g. Media should report fairly the result of any legal action brought against them and have an obligation to publish/broadcast, without diluting the finding, any adjudication by the Media Council on a complaint made against them.

### 2. OPPORTUNITY TO REPLY

Media have an obligation to give a fair opportunity to reply to any individual or organisation on which the media itself comments on editorially.

Journalists should offer a fair opportunity for individuals and organizations to respond to criticism or allegations.

### 3. PRIVACY

- a. Publication of information about the private lives or concerns of individuals without their consent is acceptable only if the intrusion relates to legitimate public interest outweighing the normal right to privacy.

- b. Prominence in public life does not disqualify individuals from the right to privacy about their personal affairs unless these matters affect their performance or fitness for the public role or office they seek or hold.
- c. Journalists should avoid identifying innocent relations of persons convicted or accused of crime unless the connection is relevant to the story reported.

#### 4. HARASSMENT AND PURSUIT

Media must not seek interviews, information or pictures by intimidation or harassment. Nor should the media invade individuals' privacy by deception, eavesdropping or covert technological means (including the taking of pictures in private places by long lens photography).

Information and picture gathering by such methods can be justified where the material sought is published in the public interest and could not be obtained in any other way.

#### 5. SUBTERFUGE

Media organizations should use straightforward means to obtain information and pictures, normally identifying themselves when doing so. Use of subterfuge, false identity or covert recording, can be justified only when the material sought ought to be published in the public interest and could not be obtained in any other way.

Journalists should never exploit a person's vulnerability or ignorance of media practice.

#### 6. DISCRIMINATION

- a. The Media should avoid discriminatory or denigratory references to people's gender, race, colour, religion, sexual orientation or sexual preference, physical or mental disability or illness, or age.
- b. The Media should not refer to a person's gender, race, colour, religion, sexual orientation, or physical or mental illness in a prejudicial or pejorative context except where it is strictly relevant to the matter reported or adds significantly to readers', viewers' or listeners' understanding of that matter.
- c. While media is free to report and comment on all matters of public interest, it is their duty not to publish material in a form likely to promote or encourage racial hatred or discord.

#### 7. WOMEN

Media should try wherever possible to use gender sensitive language when writing news stories.

#### 8. CHILDREN

- a. Generally, media people should not interview or photograph a child under the age of 18 in the absence of, or without the consent of a parent or other adult responsible for the child.
- b. Discretion should be exercised when interviewing children under the age of 18 about subjects which might have legal or moral consequences, or where such interviews could place them in a detrimental position threatening their safety or well-being. Generally, children should not be approached by the media, interviewed or photographed at school without the permission of school authorities.
- c. The names of persons under the age of 18 who are charged with crimes or involved in other offences should not be released.

#### 9. VICTIMS IN SEXUAL CASES

- a. Media people must not identify victims of sexual assaults or publish material likely to contribute to their identification without their informed consent.
- b. Media should not identify children under the age of 18 either as victims or witnesses in cases alleging sexual offences.
- c. Reports of cases alleging sexual offences against a child may identify an adult concerned, providing they are not related, but must not identify the child, and must not include facts which imply a close relationship between an accused adult and a child victim. Where either party is identifiable, the word "incest" should not be used.

#### 10. SEXUAL RELATIONS AND CONDUCT

When reporting, or portraying, sexual activity and conduct, media organizations should be aware of the danger of publishing material that affronts or offends public decency or the likely audience or readership. Particular regard should be paid to the context of publication and time of transmission.

#### 11. CRIME

Crime and antisocial behaviour, especially involving violence, should not be glamorised or reported, portrayed or detailed in a manner which on reasonable judgment would be likely to encourage or incite or experiment. Media should

pay particular regard to the context, time of transmission and probable effect and the likely audience or readership of such items. Special attention should be paid to the likelihood of such material being read, seen or listened to by children.

## 12. PAYMENTS FOR ARTICLES ETC

- a. Payments or offers of payment must not be made directly or through agents to people engaged in or convicted of crime for information or articles related to their crimes, or for pictures whose value lies in their association with crime. Nor should such payments or offers be made to associates of persons engaged in or convicted of crime, including their family, friends, neighbours and colleagues.
- b. No payment or offer of payment should be made directly or indirectly, to any person known to be, or reasonably expected to be, a witness in criminal proceedings, for information or articles in connection with the proceedings until after their conclusion.
- c. Payment or an offer of payment may be justified if information which ought to be published in the overriding, public interest cannot be obtained by any other means.

## 13. RELIGION

While all public institutions are properly subject to scrutiny, inquiry and comment, media organizations should approach and refer to religious bodies in a balanced, fair and sensitive manner, recognizing the respect and reverence in which they, their representatives and their beliefs are likely to be held by adherents.

## 14. VANUATU CHIEFS

While free to report and to comment in the public interest on Vanuatu chiefly institutions, traditions, affairs and other cultural matters, media should take particular care to deal with these subjects with sensitivity and appropriate respect.

## 15. STRONG LANGUAGE

Media should avoid gratuitous use of strong swearwords, obscene or blasphemous language in copy or broadcasts. Publication or broadcasting of these in direct form can be justified only in rare cases when it is essential to readers' or audiences' understanding of the story reported or the dramatic development of a programme. In such cases care must be taken in choosing the context and scheduling of the material concerned to avoid unnecessarily causing offence to its likely readers or audience.

## 16. GRIEF AND BEREAVEMENT

Media organisations should respect personal grief, taking care to make any necessary approaches and inquiries with sensitivity and discretion.

## 17. ADVERTISING

Advertisements and advertiser-sponsored material must be clearly distinguishable from general editorial and programme matter, where necessary by being clearly labelled in print or on air as 'advertisement', 'advertising feature' etc.

## 18. PERSONAL INTEREST AND INFLUENCES

- a. Media people should not allow personal or family interests to influence them in their professional duties. There will be occasions where journalists may be pressured by close associates about a story. At all times the journalist must make their editor, or supervisor, aware of such pressure.
- b. Media people should not allow themselves to be influenced by any consideration, gift or advantage offered to them, or by advertising or other commercial considerations. At all times the journalist must make their editor/supervisor aware of such an offer.
- c. There will be occasions where journalists will be asked to cover assignments where the journalist may have a conflict of interest or a personal interest. At all times the journalist must make their editor/supervisor aware of such a conflict.

## 19. FINANCIAL JOURNALISM

- a. Media people should not use for their own, or their families' profit, directly or indirectly, financial information received in their professional capacity in advance of its general publication.
- b. They should not write or broadcast about shares or securities in which they or their families have an interest without disclosing the interest to their editor (or financial editor) and, where appropriate, to their readers or audience.
- c. They should not buy or sell shares or securities about which they have written recently or which they intend to write about in the near future.

## 20. CONFIDENTIAL AND OTHER SOURCES

- a. Journalists of all media have an obligation to protect confidential sources of information, and to respect confidences knowingly and willingly accepted in the course of their occupation.

- b. Plagiarism is not acceptable. Where material originally prepared by another medium is used and quoted, credit should be given to the originator of the item or story.

## 21. TASTE AND DECENCY

Media should recognise currently accepted general standards of decency and taste in language and behaviour, bearing in mind the context in which the language and behaviour occur (including humour, satire and drama), and, for broadcasters, the timing of transmission and likely audience of the programme.

## 22. IMPARTIALITY AND BALANCE

Media should endeavour to show fairness at all times, and impartiality and balance in any item or programme, when presenting news which deals with political matters, current affairs, and controversial questions.

## 23. DECEPTIVE PRACTICES

Media should abstain from use of any deceptive practice or technique (including transmission or publication of 'reconstructions' or library pictures, film and recordings which are not clearly identifiable as such) which may diminish viewers' and listeners' or readers' confidence in the integrity of media.

## 24. INTERVIEWS

Interviews for print, electronic media, radio and television must be arranged, conducted, and edited fairly and honestly. Potential interviewees are entitled to know in advance the format, subject and purpose of their interview, whether it will be transmitted live or recorded, when it will be printed, whether it may be edited, and whether only part of it may be used, or it may not be used at all.

They are also entitled to know in advance the identity and roles of other people likely to be interviewed at the same time or on the same subject for the same programme or article. The presentation and editing of an interview must not distort or misrepresent the views of the interviewee or give a false impression of dialogue or the pretence that a recorded interview is being transmitted live.

## 25. VIOLENCE

Violence shown graphically or realistically indicated by sound must be justifiable in its context and intensity as being necessary to the programme or article. Violence combined with sexuality should not be printed or transmitted in a manner designed to titillate its audience. Explicit detail and prolonged focus on sexually violent contact must be avoided.

## 26. DISTRESSING MATERIAL

- a. Editors, producers and broadcasters of news, current affairs and documentary programmes and articles should take particular care in deciding whether the inclusion of graphic detail and intensity of violent or distressful, material is warranted by its relevance and add to public understanding, of the subject.
- b. Special consideration must be given before publication or transmission of particularly disturbing, images including:
  - I. Torture or ill-treatment of people or animals
  - II. Close-ups of dead or mutilated bodies
  - III. Images of people in extreme pain or on the point of death
  - IV. Violence or ill treatment of children.

## 27. DANGEROUS AND ANTI-SOCIAL DETAIL

Detailed pictures or information about methods of incendiary devices, or illicit use of drugs or solvents should not be transmitted in a way which might encourage or instruct such actions.

## 28. CRIME AND DISORDER

Programmes or articles likely to promote civil insurrection or encourage crime or public disorder must not be broadcast or published.

## 29. HIJACKING AND KIDNAPPING

No information should be published or broadcast which is likely to endanger lives in, or prejudice attempts to deal with, a hijack or kidnapping.

## 30. MISINFORMATION

- a. Anonymous serious threats must be reported immediately to the police. Do not publish or broadcast any such threats unless requested to do so by the police or a civilian authority for reasons of public safety. If such a threat causes widespread inconvenience or other consequences affecting the public (with the exception of airline delays), it may be reported.
- b. Aim to always attribute information to its source and make sure that source has the authority to speak for the organization or individual they claim to represent. Check press releases from unfamiliar sources, individuals or groups to ensure they truly represent a statement from that individual, group or organisation. When press releases are unsigned, check to ensure they are authentic and endorsed by the issuing body.



### 31. PRODUCT PLACEMENT AND REFERENCE

When media choose to place commercial or other products or promotional material on air or in print in a programme or article context, it should be a clear policy that the commercial or other organisation thus identified has no influence on the content of the programme or article unless specifically publicized as such.

### 32. COMPETITION FAIR DEALING

Media will ensure that in competitions there is no collusion between broadcasters or publishers and contestants which results in the favouring of any contestant or contestants over others.

### 33. RESPECT and TOLERANCE

Media must ensure that members and their organisations must exercise respect and tolerance towards each other and their dealings.

*(Source: Media Association Vanuatu, 2011)*

## Feedback on this Resource

Please help us to improve this guide. Email us your feedback using the questions below and send to: [resources@livelearn.org](mailto:resources@livelearn.org).

Or photocopy this page and post to Live & Learn Vanuatu,  
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# Invasive Species in Vanuatu

## Media guide

The Invasive species Media guide helps journalists and communicators to promote and accurately report on invasive species issues in Vanuatu.

It contains information on the types of invasive species in Vanuatu, their impacts on the natural environment, people and the economy, management options and links to wider networks and information.

It also provides valuable guidance on best-practice journalism, covering principles such as accuracy, factual reporting and reliability. The guide is an important reference tool for journalists covering any environmental issues, especially invasive species, across Vanuatu.



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