Invasive Species in Vanuatu

A Community Learning Guide

LIVE&LEARN
Environmental Education

Introductory section: Guidelines for the facilitator

About this flipchart

This flipchart is designed to help communities learn more about invasive species in their local area and how to control the spread of invasive species. The objectives of the flip chart are to:

- Increase awareness and knowledge about invasive species and the most common invasive species in Vanuatu.
- Develop community knowledge of the major impacts of invasive species on the natural environment and communities, with a focus on Big Leaf Rope (Merremia peltata).
- Develop skills in managing invasive species using integrated methods.

Who can use this flipchart

The flip chart is designed to support community groups working to address the issue of invasive species in Vanuatu. These groups can include farmers, NGOs and other agencies. Government ministries, high schools, universities and colleges may also find the chart useful.

How to use this flipchart

There are 8 sessions/topics altogether in this flipchart which can be used to increase awareness about invasive species in Vanuatu. The sessions can either be presented page by page or you may like to present the session most relevant to the group.

There is an illustration on the front of each page, which faces the group. The back of each page has detailed information on how to facilitate the discussions. It contains either one or more of the three sections below:

1. Background information: This information is only for the facilitator and is usually not to read out to the group. This information provides the context for each discussion.
2. Discussion questions: Use these questions to generate a discussion with the group based on the illustration.
3. Activity ideas: Use these ideas to undertake an activity with the group. This will help to break up the talking and will support the reinforcement of ideas and key concepts.

Topic guide

There are 8 topics in this flipchart:

Preparing for the session

To facilitate means to 'make things easy'. Your role as a facilitator is to encourage the learning process by creating an environment which encourages sharing ideas and experiences. You do not have to be an expert on invasive species, however here are some tips that could help this process:

- Familiarise yourself with the flipchart material. Read each session in the flipchart and make sure you understand it. Think about questions participants might ask and prepare some answers. Ask others for help if you need it.
- Encourage the participants as much as possible to share their ideas to keep the discussion going.
- Be friendly and inclusive. Make sure you encourage men, women and youth to participate in the sessions. Listen to and acknowledge everyone's ideas.
- Be gender sensitive. Respect men's and women's different ways of learning and give them space to share their ideas.
- Sometimes people will have strong and conflicting ideas on a subject. Relationships within the group will affect the way the group works together. Be sensitive to possible tensions in the group and encourage people to work through their differences.

Introductory points

1. Welcome the participants and thank them for coming.
2. Introduce yourself, any members of your team, the objectives of the sessions and the times you will take breaks and end sessions.
3. Make sure the Flipchart is placed in a position where all the participants can see the illustrations and hear you clearly. It might be easier to work in smaller groups - perhaps up to 15 people - to ensure that all participants can see the resource.
4. Explain the objectives of the flipchart and how the flipchart will be used.
5. Inform the group about how you will deal with their questions. Encourage them to ask as many questions as they need to. Emphasise that in your role as a facilitator, you are there to help with the learning process.
6. Before the session begins, make sure you set up some ground rules to guide your discussions. These rules are there to help guide the group on how to interact respectfully and fairly. You may ask the group for their suggestion or offer some of your own ideas. E.g. one person at a time should speak, do not talk over or interrupt people.

A word on community

The word 'participants' and 'communities' are used interchangeably throughout this Flipchart. They represent the men, women, boys and girls in communities. It is important that you as a facilitator encourage all members of the community to attend sessions and participate freely. It is also important to run the sessions at a time when everyone can attend. When running some sessions, you may need to split the groups according to cultural norms – for example separate groups which contain only women, girls, men and boys. This will help participants share their ideas freely in smaller groups.

Session 1

Topic 1: What is an 'Invasive Species'?

Learning outcomes

After completing this topic, participants will be able to:

- Explain what an invasive species is.
- Name some examples of invasive species in Vanuatu.
- Demonstrate an increased awareness about the problem of invasive species in Vanuatu.

Background information for the facilitator:

Invasive species are plants and animals that thrive and expand in an area where they are not wanted, causing environmental, social and economic problems. Usually, people introduce these foreign species into an area, either intentionally or accidently. However some invasive species are native and become a problem after significant changes occur in the environment (e.g. deforestation). Invasive species are able to reproduce and spread within the local environment without any further assistance from people. Native species are those species that originally or naturally occur within a local environment, with no human intervention.

Examples of invasive species in Vanuatu include Big Leaf Rope (*Merremia peltata*), Mile-a-Minute (Mikania micrantha), Tora (*Cassia tora*), Giant Sensitive Plant (*Mimosa diplotricha*), Indian Mynah bird (*Acridotheres tristis*) and the East-African Land Snail (*Achatina fulica*).

Vanuatu is particularly vulnerable to invasive species because it is an isolated island nation and has been inhabited by humans for a relatively short period of time (compared to other countries). The native species of Vanuatu have not yet developed coping strategies to deal with the impacts from aggressive pests and weeds from other countries.

Most invasive species have arrived or are still arriving in Vanuatu as a result of humans deliberately or accidentally bringing the new species with them when they arrive in Vanuatu. The early Europeans brought with them many new species on their boats. Today, invasive species arrive via cargo and with passengers themselves in boats and aeroplanes, both from within Vanuatu and from other countries.

Invasive species cause significant harm to communities, the economy and the natural environment. These impacts are covered in detail in session 4.

Activity: Community comparison

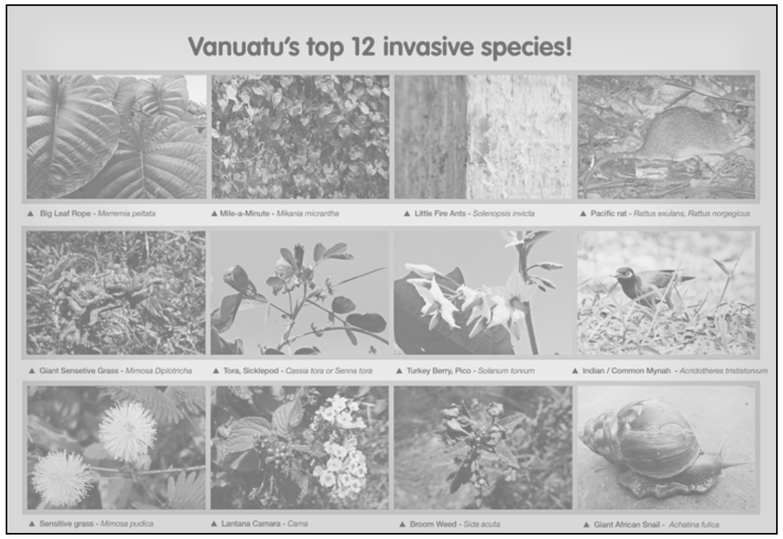
1. Introduce the activity to the group and present the front of the chart, which shows two communities in Vanuatu – one that is affected by invasive species and one that isn't.
2. Break the group into smaller sub groups and ask them to develop answers to the discussion questions (below), using the images on the front of the chart to help them. You may like to read out the discussion questions to the groups or pre prepare the questions on a large sheet of paper for display.
3. After enough time (perhaps 20 minutes), ask the whole group to resume. Each group can present their answers to the whole group. Encourage debate and further discussion.
4. If possible, record the main points from each group on a large piece of paper. From these points, you can try and develop your communities' own unique definition of invasive species.

Discussion questions:

1. What are some of the differences between the two communities?
2. What is an invasive species? Why are they called 'invasive'?
3. What are some examples of invasive species? You can use examples from the chart and/or from your community.
4. Why are these species' called invasive? What effect do they have on the environment?
5. Which community would you prefer to live in? Why?

Session 2

Topic 2: Invasive Species in Vanuatu



Learning outcomes

After completing this topic, participants should be able to:

- Name and identify the most common and problematic invasive species that occur across Vanuatu.
- Describe a weed species based on plant characteristics commonly used to identify weeds.
- Explain some of the reasons why these are the most problematic species.

Background information for the facilitator:

It is estimated that there are over fifty different invasive species present in Vanuatu. These foreign species arrived in Vanuatu in a number of ways – some were deliberately introduced for biological control options (e.g. mosquito fish), some were accidently introduced (e.g. by tourists or live plant imports) and some were introduced for other purposes (e.g. as camoflage for army bases during the war). The invasive species found in Vanuatu are common to other Pacific and Asian countries however the impacts on Vanuatu's communities and environment are unique. Each community is different and as such each community has different issues relating to invasive species. However, there are a range of invasive species that are common, widespread and problematic in Vanuatu. These include:

Big Leaf Rope *(Merremia peltata)*: Considered to be the most problematic weed currently affecting Vanuatu. It has smooth large leaves, yellow and creamy white flowers and dull brown seeds. An aggressive and fast growing vine which smothers shrubs and trees, particularly after disturbance has occurred (e.g. land clearing, cyclone damage).

Mile-a-Minute (*Mikania micrantha*): This is a creeping vine with heart-shaped leaves, small greenish-white flowers (3-5 mm long) and black oblong shapes seeds. Similar to Merremia, it smothers out other plants and likes disturbed areas such as forests, roadsides, cultivated areas and waterways.

Tora (*Cassia tora or Senna tora)*: A herb which grows to around 1 mt tall with distinct yellow flowers and slender curved seed pods. Seeds are brown, flat and approximately 3 mm long. Leaves are 4-8 cm long. Occurs in pastures, roadsides and in wasteland. Is thought to have originated in South Asia.

Giant sensitive plant (*Mimosa diplotricha*): An erect shrub which climbs, has a strong root system, can form thickets and has a woody stem with spikes. The leaves are sensitive to touch and the flowers are hairy and purple. It has light brown seeds. Found in pastures, plantations and roadsides. Often dies in drought conditions.

Turkey Berry/Pico (*Solanum torvum*): A shrub which stands up to 4 mts with scattered prickles on the stem. White flowers of 12-18 mm are found along the stem and the many fruits are green or yellow berries (10-15 mm). Found in pastures, roadsides, wasteland and disturbed areas. Native to the Americas.

Indian Myna bird (*Acridotheres tristis*): A brown bird with a black head and yellow legs, bill and eye skin. In flight it displays characteristic white patches on its wings. Standing height is about 15cm. It is aggressive and adaptable and out compete's native birds by taking over their nests, killing their chicks and destroying their eggs. It 'struts' rather than walks and is generally not afraid of humans. Originated from South Asia.

Giant African Land Snail (*Achatina fulica*): A large snail which originates from coastal east Africa. Its shell is reddish-brown with pale yellow markings and is usually 5-10 cm long (however can grow up to 20 cm long). Its shell is twice as long as it is wide. Causes severe infestation of crops and alters ecosystems.

Fire Ants *(Solenopsis invicta*): A small (2-6 mm) reddish brown ant with a dark brown abdomen, originally from South America. They are aggressive if disturbed and their bite can cause serious pain requiring first aid. Their ground nests come in all shapes and sizes and do not have obvious entry and exit points. There are many different sized ants within each nest.

All of these species are profiled on the front of the chart and your accompanying resource [*Invasive Species, Identification Guide*] has a more detailed profile of these species and other invasive species in Vanautu.

Weed Identification

When we identify weeds, we need to look for and study the characteristics of the various plant structures, and if there are any distinguising features that make it easily recognisable.

The plant structures/characteristics we look for include:

- Plant type & growth form – What type of plant is the weed? Is it a tree, vine, shrub, grass, herb, aquatic plant or a succuent? What is it's growth form? Does it grown upright, creep along the groung, 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?
- Fruits and Seeds – What is the colour, size and shape of the fruit? Where is it located on the plant?

Again, your accompanying *Invasive Species* guide has more detailed information on weed idenitifcation.

Activity: Weed identification

Pre - session preparation: Before the session begins, read the section in the pocket guide called 'How to collect specimens for identification'. Then, walk around the community and collect some weed samples according to what you have learn't. You need to collect samples that are profiled on the front of this chart. Most communities will have these weeds in them, you just need to know what to look for! Make sure you collect samples which you can identify as you may need to assist participants in identifying these in the session. The pictures on the front of this chart and the pocket guide will guide you on this.

1. Introduce the activity to the group. Explain to participants that they will be learning about common weeds in Vanuatu and how to identify some of these common weeds.

   Explain that when we identify weeds, we study the characteristics of the various plant structures described in the background information and in the pocket guide (i.e. form, leaves, flowers, fruits and seeds).

2. Ask the group to break into smaller sub-groups. About four people to a group is a good number. Distribute one weed specimen to each group.
3. Ask each subgroup to study their weed specimen and discuss/come up with answers the following questions:
   - Identify and describe some of the main characteristics of the plant structures.
   - Does the plant have any distinguishing features that make it easy to identify?
   - Do you know the name of this weed? Does it have a few different names? For example scientific, common and local names. What is it known as in your local community?
4. Ask each group to present their findings to the wider group. This allows everyone to develop an understanding of the most common weed species that occur in Vanuatu and how to identify them.

Refer to the front of the chart and explain that these are the most common invasive species in Vanuatu. They include both weeds and pest animals. Go through each species, particularly the ones that haven't yet been addressed in the workshop (i.e. the pest animals). Use the pocket guide for more technical information if you require it.

Alternative Activity: Focus Discussion

This activity is for groups that do not have or cannot find the common profiled weeds in their local area.

Vanuatu's top 12 invasive species!

▲ **Big Leaf Rope** - *Merremia peltata*

▲ **Mile-a-Minute** - *Mikania micrantha*

▲ **Little Fire Ants** - *Solenopsis invicta*

▲ **Pacific rat** - *Rattus exulans, Rattus norgegicus*

▲ **Giant Sensetive Grass** - *Mimosa Diplotricha*

▲ **Tora, Sicklepod** - *Cassia tora or Senna tora*

▲ **Turkey Berry, Pico** - *Solanum torvum*

▲ **Indian / Common Mynah** - *Acridotheres trististorvum*

▲ **Sensitive grass** - *Mimosa pudica*

▲ **Lantana Camara** - *Cama*

▲ **Broom Weed** - *Sida acuta*

▲ **Giant African Snail** - *Achatina fulica*

Session 3

Invasive Species in our Local Community

Learning outcomes

After completing this topic, participants should be able to:

- Name and identify the most common and problematic invasive species that occur in their local community (at least three different species).
- Identify on a map or explain where in the local community these invasive species occur.

Background information for the facilitator:

Vanuatu currently has no detailed maps available to communities about the status and distribution of invasive species across the country. However, it is possible to develop an understanding of the extent of invasive species in your local community by using existing local knowledge. In fact, local knowledge is often more accurate and helpful than other resources. Most communities have some invasive species in them. This is unfortunate but it is the reality of the situation in Vanuatu. Some areas are much affected and others are lucky enough to only slightly affected. Generally, remote communities are less affected by pests and weeds than communities with higher populations and where the movement of people in and out of the community is greater.

Before you start the activities in this session, it is important than you conduct your own background research on the target community/s. It is beyond the scope of this resource to provide detailed information on the status of invasive species for every community area in Vanuatu. You will need to identify the most common pest and weed species that exist within the community and where they exist (generally). It may be useful to meet with community leaders and farmers before starting this actvitiy to gain an insight into the types of weeds and pests that exist. The previous session, 'Invasive Species in Vanuatu' and the accompanying pocket guide 'Farmer's Pocket Guide on Invasive Species' will help you to do this.

The aim of both of the activities is to learn more about which invasive species (flora and fauna) occur and where these species occur in the local community.

Activity: Discovery walk

1. Before you start walking, it may be better to decide as a group where you should go first or make a rough plan as to the route you will take. You should aim to visit flower gardens, food gardens, waterways, road sides and any other important areas.
2. Now go for a walk!
3. At each important place stop – look – discuss. Try to identify the invasive species that you find.
4. Discuss how the species may have arrived in the community and if it has any current community uses (e.g. aesthetic, medicinal). Try to also identify native species and discuss the differences between those and invasive species.

Activity: Community mapping

For this activity you need to create a map of the village which identifies important areas for invasives. If there is time, you can do this as an extension activity to the discovery walk. If your community is quite large there are a couple of options: you can take a short walk around a specific area or just discuss and start mapping without walking.

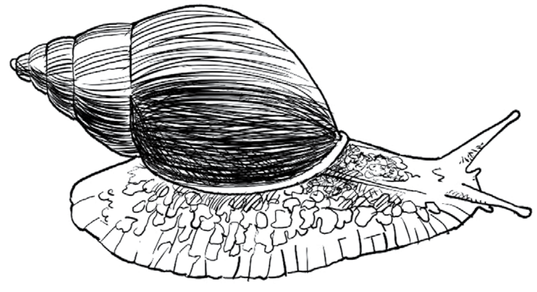
Make your map on butcher's paper, a blackboard or by drawing in the dirt. On the map, include the following areas:

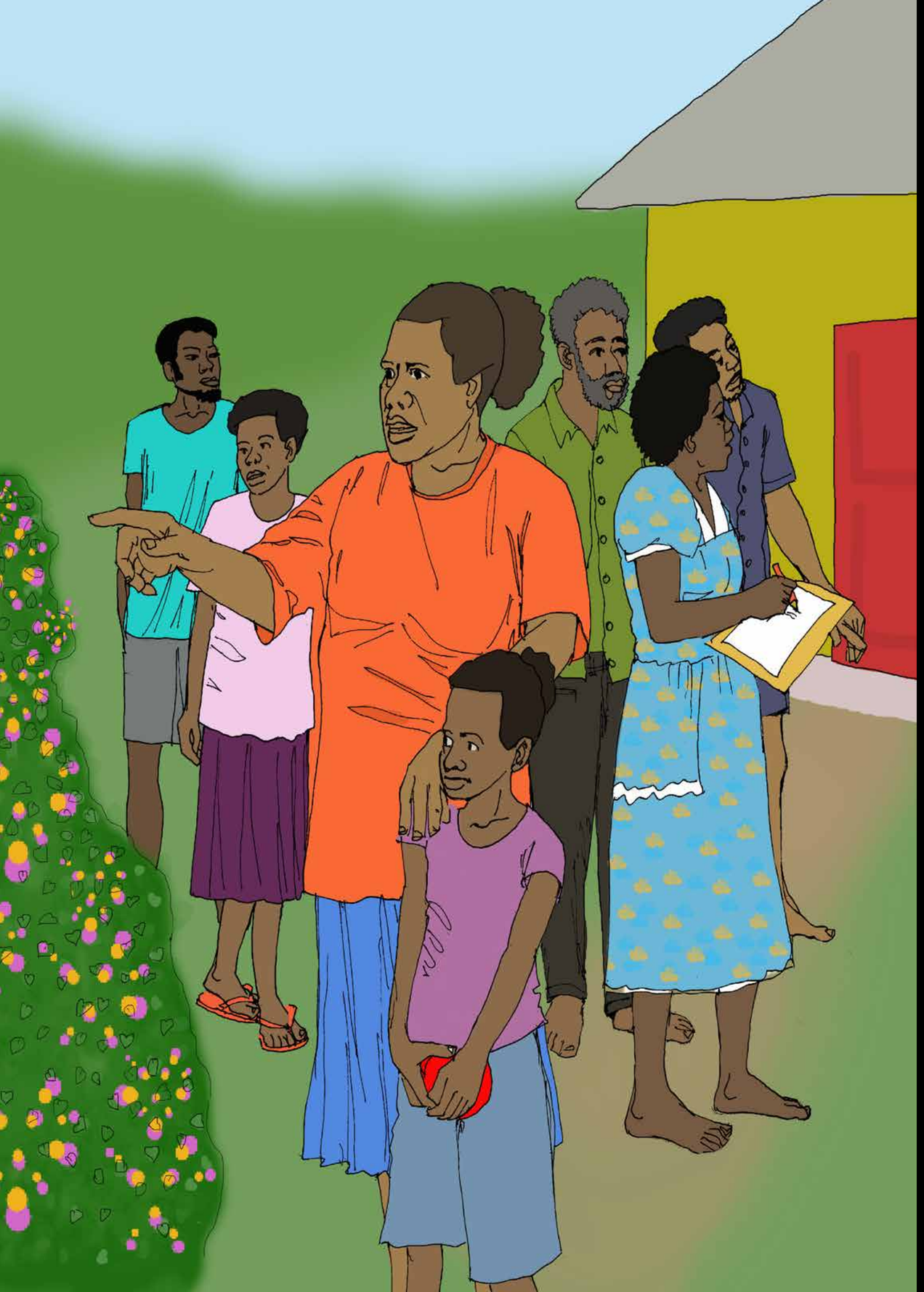
- Gardens and small farm plots,
- Important cultural areas,
- Areas where invasive species are known to occur, and
- Any other important community areas.

Discussion Questions:

Following the discovery walk, or as part of the mapping exercise, use the following questions to initiate a group discussion:

1. What invasive species did we find?
2. Where did we find them? Are there any 'hotspots'?
3. What are the main crops you grow in your garden?
4. Are there any conservation areas in the community?
5. How do you decide how land will be used? Who decides?
6. What role do men and women have in making decisions about gardens, plantations, conservation and tourism?
7. Does the amount of land area covered by invasive species (e.g. *Merremia peltata*) affect land use in your community?





Session 4

Topic 4: The Impacts of Invasive Species on our Environment

Learning outcomes

After completing this topic, participants should be able to:

- Appreciate that invasive species take their toll on the natural environment, communities and the economy of Vanuatu.
- Identify and explain how invasive species negatively affect the natural environment, communities and the economy.

Background information for the facilitator

The Environment is more than just the forests and wildlife. When we talk about environment, we are referring to the entire system that we live in. This includes people, agriculture, biodiversity, small businesses, tourism, ecosystems, community health and much more. The more we start to think of the environment as a whole and interconnected system, the more likely we are to be able to address sustainability issues, such as invasive species, in a better way.

Invasive species represents the biggest threat to Vanuatu's biodiversity after habitat loss. They can change entire ecosystems by overtaking native species that inhabit a local area. In some cases, they can cause some native species to become threatened or extinct. For example, Indian Mynah birds prey on native bird's eggs for food, which has resulted in the loss of many native birds in Port Vila and Efate, Luganville on Santo Island and Tanna Island in the south (where the rate of invasion is particularly high). Native birds have a role in pollinating forest plants and spreading seed, so these functions are also lost with the loss of native birds. This then affects the people of Vanuatu, as they depend on natural areas for food, shelter, water, traditional medicines and tourism.

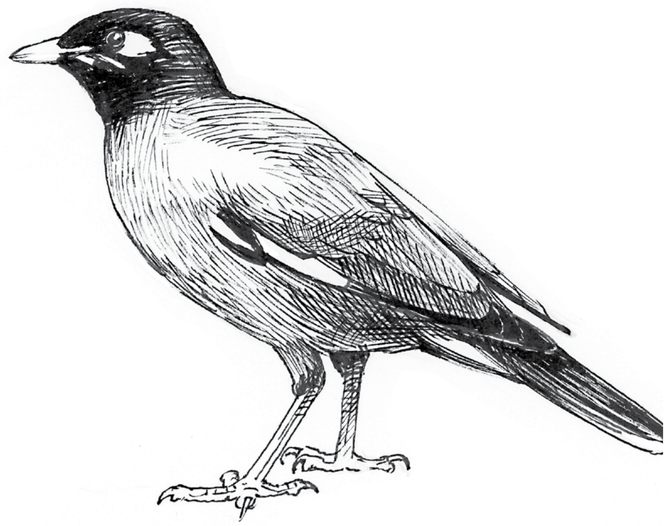
Invasive species also affect our ability to grow enough food for ourselves. Weeds compete with crops for basic needs - water, sunlight and nutrients – and many pest species attack agricultural crops and reduce yields. Reduced crop yields can increase supply demand, which then drives up the price of food at the local market. For some, this may mean going hungry during tough times. The flow on effect from this is greater community health problems.

Activity: Story telling

1. Break up the groups into smaller sub-groups. Four per sub-group is a good number.
2. Ask participants to develop a story that shows how invasive species can impact the WHOLE environment – the economy, communities and the natural world. The story should demonstrate how these elements are interconnected and dependent upon each other. It can be based on a situation that is currently occurring in the community, a situation that occurred in the past or it can be a fictitious story.
3. Ask each sub-group to present their story to the wider group. Listen to each story carefully, making notes of where and how within each story the impacts of invasive species are illustrated.
4. Once this is done, facilitate a group discussion using the questions below as a guide.

Discussion questions:

- Recap – from listening to all of the stories, now ask participants to identify the main ways in which invasive species can negatively affect the whole environment. If they are having trouble, use your notes to remind them.
- Do you think that invasive species affect some parts of the whole environment more than other parts? Or do invasive species affects these areas equally? Explain.
- On a scale of 1 to 5 (one being not concerned and 5 being very concerned), how concerned are you about native species in your local area? Why?



Session 5

Topic 5: Big Leaf Rope – Let's Learn More!

Learning outcomes

By the end of this session participants should be able to:

- Identify Merremia by describing some of its main characteristics.
- Appreciate that Merremia grows very quickly and explain some of the factors that contribute to it's spread.

Background information for the facilitator:

Merremia peltata is considered by many as the most problematic weed species within Vanuatu. Merremia has become such a big problem because it grows very rapidly and aggressively, completely overtaking and strangling other vegetation in its path. Merremia is native to the Indo-Pacific region however there is debate about which countries in the Pacific it is native to, as it acts like a weed in many Pacific countries. In Vanuatu, it is widely believed that it was introduced after World War II.

Regardless of its history, it is clear that the species now poses a serious threat to the environment of Vanuatu. Its ability to grow very rapidly, strangle forests and choke out other vegetation is having a profound impact on Vanuatu's biodiversity and food security.

Merremia is a climbing vine with large, smooth, heart-shaped leaves and purple veins underneath. It has smooth climbing stems (up to 20 mts long) with twining tips. The sap is milky and the roots have underground tubers which are difficult to eradicate. Its flowers are creamy white or yellow, funnel shaped and 15-30 cm long. It has dull brown seeds and reproduces via seeds and also takes root from its stems.

The main things to look for when identifying Merremia are: big, smooth, heart-shaped leaves, spiralling/twining stem ends, long stems and yellow and creamy white flowers.

The species grows in lowland areas (below 300 mts elevation) and is often seen growing in forests, on forest edges, along roadsides and on open hillsides. It is very common in disturbed areas. *Merremia* spreads after an area has been disturbed and needs full sunlight to grow.

You can prevent its spread by minimising disturbance of vegetation in the first place. If Merremia already exists in an area, then there are a number of options. It can be grazed by cattle or managed with the application of a suitable herbicide (e.g. glyphosate). As it needs full sunlight, you can also plant trees to shade it out, however this is labour intensive as you will have to manually stop the vine overtaking the trees before they reach a suitable height. Hand removal is also possible but labour intensive as the species re-sprouts and re-roots very easily.

Activity: Identifying Merremia

1. **Pre-preparation:** Collect Merremia samples before the activity. Try to have samples of the main plant structures - roots, stems and flowers.
2. Start the activity by exploring the history of Merremia in the local community. Have the group sit in a circle and ask participants to brainstorm all of the different names for Merremia in the local area. If there are some names in the local language, this may indicate that Merremia has been around this area for a long time.
3. Now distribute some Merremia samples around the group. Display the visual profiles of Merremia on the front of the flipchart to the whole group. Explain to the group that they will be helping to identify some of the main features or characteristics of Merremia.
4. Ask participants to identify some of the main features of Merremia. Ask them to provide some descriptions of the following: the leaves, then stems, the flowers and how they have seen it growing in the environment. As people provide their answers, make a summary list on a large sheet of butcher's paper. At the end of the session, re cap on the main identification features of Merremia, using your notes to help you if need be.

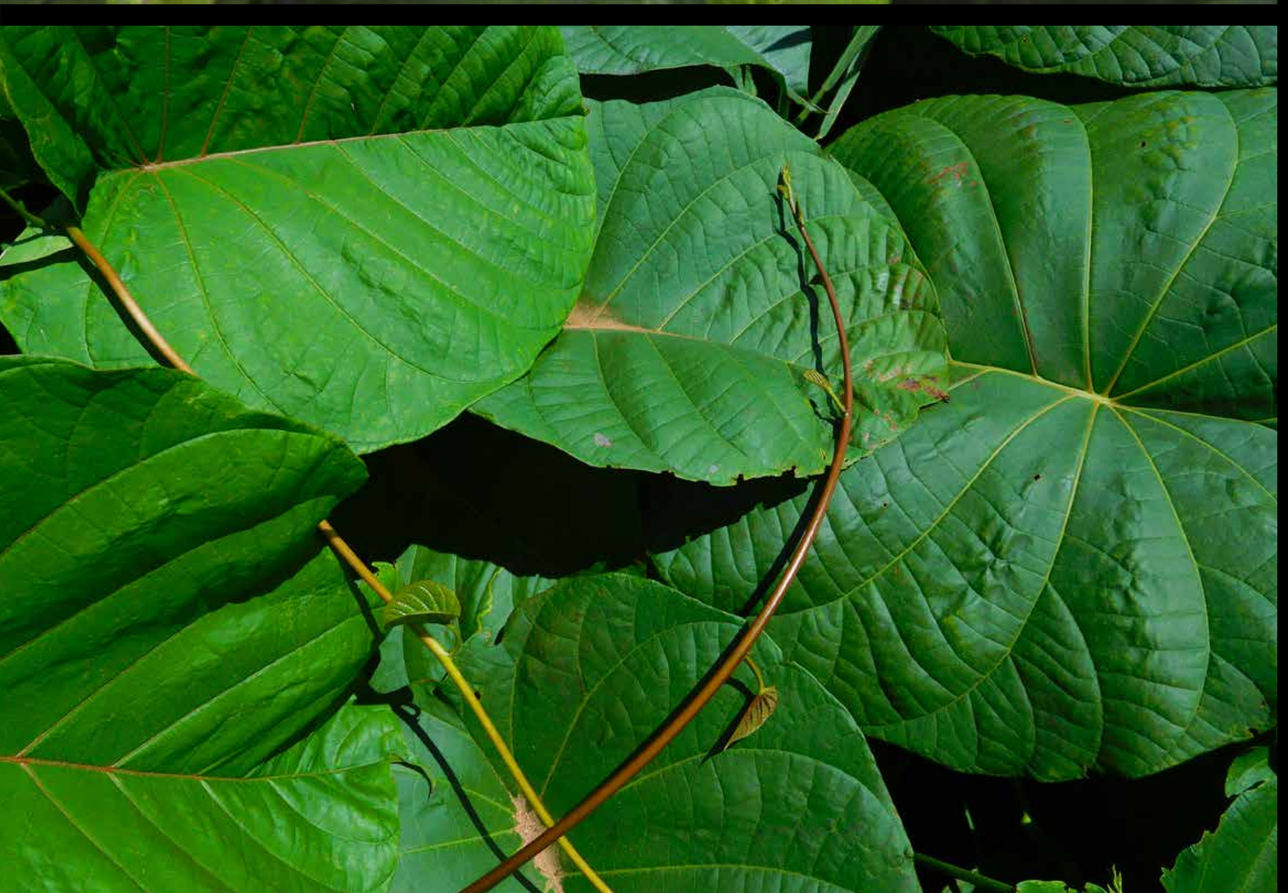
Activity: Measuring vine growth over 24 hours

You will need: a marker, bush knife, stick, ruler/measuring tape and a camera (if available).

1. In this activity you will have the opportunity to observe how fast Merremia grows and then estimate a weekly or monthly growth rate. You will then be able to appreciate the impact the vine could have on crops or a forest if left unattended for a period of time.
2. Choose a site with Merremia growing on it. As a group or in sub-groups mark the very tip of some vine. Record the exact time that this occurred.
3. Return to the site the next day at about the same time and measure how much the vine has grown within the time period. You can also return in a weeks' time to measure how much the vine has grown within a week. Extrapolate these growth rates to a month and envisage as a group how much the vine may have taken over the area within a month.
4. You can also compare the growth rate of Merremia to another invasive vine in your local community e.g. Mikania micrantha (Mile a minute).

Discussion questions:

- Why do you think Merremia is so destructive? How does it compare to other weeds in the local area?
- What factors contribute to its spread?
- Do you think it is a big threat in your community? Explain your reasons why or why not.



Session 6

Topic 6: Uses of and Alternatives to Big Leaf Rope

Learning outcomes

By the end of this session, participants should be able to:

- Identify the main ways big leaf rope is currently used by their community.
- Identify some of the ways that they can replace big leaf rope with other alternatives.

Background information for the Facilitator

Although *Merremia* is a weed, in reality communities use this vine in many different ways in their everyday lives. There are a range of alternatives to using the weed so to reduce the negative effects it has on the environment.

Different communities use Merremia for different purposes. Some of the uses include:

- The vine is used to keep soil healthy and reduce soil erosion. It is fast growing ground cover which protects exposed soil.
- Many people use it as an ornamental plant in their gardens.
- It is used as cattle feed.
- The vine is used as a natural rope substitute in many ways. For example, the vine is used to tie up deceased people for funerals or sometimes it is used to tie up circumcisions.

There are a lot of practical alternatives to using Merremia. Some of these include:

- Plant Muccuna instead as a ground cover and soil maintainer.
- Choose native varieties for ornamental plants e.g. *Carphylon macrospermum* (palm tree), *Alpinia purpurascens* (wild ginger) and *Evodia hortensis* (Nise in Tannese).
- Use hibiscus bark as a rope replacement to tie up puddings with.

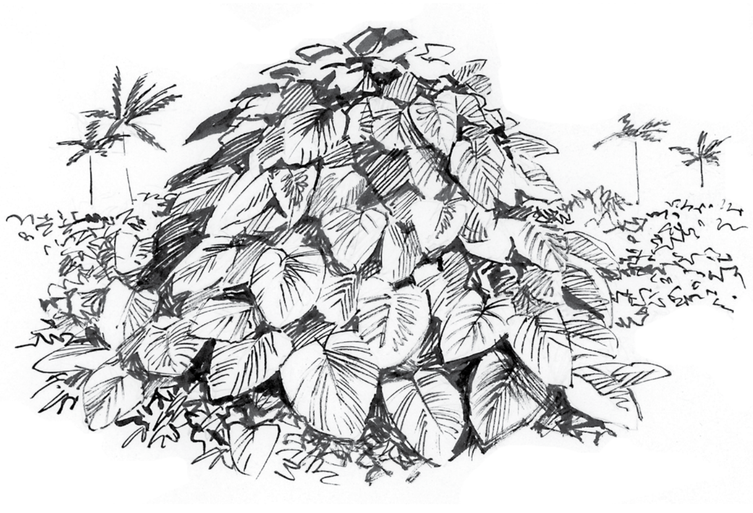
Activity: Focus Groups/Futures Thinking

You will need: Butchers paper, pens/pencils.

1. The aim of this activity is to get groups to identify and understand the main uses of *Merremia* in their community and possible future alternatives to using *Merremia.*
2. Break the group into smaller sub groups. Ask the subgroups to identify and list all of the different ways people use Merremia in the community. Participants can list these on a piece of butcher's paper if they like.
3. Then, ask participants to come up with a list of alternatives to using Merremia. For each alternative, ask them to identify some benefits and drawbacks. This will help to determine whether or not the alternative is practical and likely to be taken up by the community.
4. Once groups are finished, a presenter from each group will read out their findings. Start compiling a master list of alternatives as each group makes their presentation.
5. Once all groups have presented, review the master list with the whole group. You now have a summary of all of the alternatives to Merremia that this community can now pursue.

Discussion questions:

- Having considered the uses and possible alternatives to *Merremia* in your community, do you think it is feasible to adopt some of the alternatives? Why or why not? What are some of the barriers you might face?
- What might be the next steps the community may take?
- What is the role of both men and women?
- Can women be involved in these changes or decision making somehow?



Session 7

Topic 7: Looking at different management model in place

Learning outcomes

By the end of this session, participants should be able to:

- Know the different existing management models
- Make up their mind as to which model is relevant to their community

Background information for the facilitator:

There are different methods of controlling Merremia peltata. It can be controlled chemically and/or physically/culturally. In Vanuatu, these 2 practices have been previously applied in the field.

Activity:
Identifying different Merremia Management Models existing in our communities

1. Discuss within the whole group what existing strategies we have in our communities under chemical, physical and/or cultural
2. After having identifying this, divide into groups according to the number of controls we have come up with and discuss their advantages and disadvantages of each of these controls. Choose a group member to lead and keep the discussion going.
3. List down all these advantages and disadvantages on Butchers papers and make sure all the ideas shared by each group member is listed down.
4. By the end of this activity, choose 2 members to present your discussions to the whole group.

Materials needed for these activity:

- Butcher's papers
- Permanent markers
- Blu tack

Questions to be discussed:

1. Which of these models do you think will best suit your community?
2. Why do you think it will best fit in your community?
3. What are the impacts either environmental or economical this model might bring about?
4. How do the community work together to address this?

Session 8

Topic 8: TBA – Applying the desired model into practice

Learning outcomes

By the end of this session, participants should be able to:

- Have an in depth knowledge of Merremia peltata Management Model
- Know how the community can work together to best implement this model
- Identify what role men have in achieving this
- Identify what role women play to ensure the successful implementation of this model
- Identify what benefits the community gets from this model

Background information for the facilitator

The Merremia management model has 2 parts to it, phase one is the eradication phase and the second part is the maintenance phase.

In order to achieve these 2 phases, the communities involved will have to work in collaboration with the project to achieve this.

Phase 1

- 2 hectare plot of M. peltata infested agricultural land subdivided into 20 equal plots
- Boundaries will be fenced off with pig wire and 2 strands of barbwire to fend off pigs and cattle

Two treatments to be used

1. Weeding + uprooting of tubers + burning of brushed vines
2. Uprooted tubers and weeding plus burning + brush vines minus uprooting of tubers

- Biomass of *M. peltata* will be sampled from each of the experimental Units before the start of the study and one month after clearing to determine the total Biomass before and one month after treatment application.

Managing Weeds

Intergrated 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 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 in the market include, weedmaster duo, glyphosate, 2,4-D, 2,4,5-T, victoria gold, vigilant gel, and ultimate.

Herbicide works faster than physical and cultural control. However they are more expensive and can be hard to access in remote farming islands and communities. It can be detrimental to the ecosystem and the health of the person applying it. 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 it after a while, leading to 'super weeds'. 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 with cattle, small ruminants or horses.

Cultural control is also practiced in some parts of Vanuatu. On East Santo Forestry plantations (Whitewood) are observed to suppress the *Merremia peltata* once the forest had established a high canopy density. This method involves selective planting of crops or plants that are aggressive or more aggressive that the target weeds 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 over taking the pasture.

The 'Integrated Approach System' is an alternative. This system is developed by Live & Learn Vanuatu and currently being tested on 3 sites. The system combines physical removal of the weed by cutting, uprooting of the stem and burning of the whole plant followed with 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

Glossary

A

Abiotic – Physical and chemical environmental factors that are non-living e.g. soil, temperature, moisture.

Agro forestry – 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.

B

Bio-degradable – matter which can be broken back down into its original compounds through natural decomposition processes carried out by living organisms (usually microbes).

Bio-diversity - 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.

Biotoc - Biological/living environmental factors, for example, native plants, invasive pests.

D

De-forestation – the process of cutting down, removing and burning trees and other vegetation types.

E

Ecosystems – 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.

F

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.

H

Habitat - the home of a plant, animal and other living things, for example, in a tree, on a coral reef

Herbicide – chemicals that are applied to weeds to kill them, for example, Glyphosate.

I

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, mosquito.

L

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.

M

Mollusc – A type of invertebrate animal with a muscular foot, for example, snail.

N

Native species – see endemic species.

Nutrient cycle – the conversion of nutrients in an ecosystem from the physical environment (e.g. the soil) into the living organisms (e.g. plants) and then back into the physical environment (e.g. decomposition).

P

Pesticide – chemicals that are used to kill or repel pest animals.

Pests – 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.

R

Reforestation – Replanting trees and forests or allowing the forest to naturally grow back where previously it was degraded from 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, Merremia peltata.

Run-off - water flow that occurs over a catchment when soil is completely saturated. A normal part of the water cycle.

S

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 agro-forestry 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.

T

Threatened species – Plants or animals which are at risk of becoming extinct.

Transpiration - the loss of water from plants through their leaves. This is a part of the evaporation process within the water cycle.

V

Vertebrates – animals with a backbone, for example, fish, pigs.

W

Weeds – 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.

For more information

This Flipchart is part of a comprehensive resource kit that also includes a Pocket Guide, Media Guide and DVD.

Read/Watch:

LIVE&LEARN VANUATU

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