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| AGRICULTURAL SCIENCE | |
| Strand 2: Sustainable Primary Production | Sub-strand 2.3: **GLOBAL ISSUES AFFECTING PRIMARY PRODUCTION** |
| LESSON ACTIVITY 1: Invasive Species | |

The Specific Learning Outcome (SLO) targeted in this activity are provided below.

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| |  | | --- | | **SLO#** | | |  | | --- | | **Specific Learning Outcomes: *Students are able to*** | | |  | | --- | | **Skill level** | | |  | | --- | | **SLO code** | |
| 1 | Identify invasive species that affect local primary production. | 1 | agr2.3.1.1 |
| 2 | Describe the problems caused by invasive species for local primary production. | 2 | agr2.3.2.1 |
| 3 | Analyse how invasive species affect local primary production. | 3 | agr2.3.3.1 |
| 4 | Evaluate the impact of invasive species (plant and animal/insects) on local primary production. | 4 | agr2.3.4.1 |

**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).

**Impacts of Invasive Species on the Natural Environment**

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.

**Impacts of Invasive Species on People**

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.

Invasive species are also hazardous. They carry and transmit diseases, which again increase the health risks to humans and their domestic animals.

**Impacts of Invasive Species on the Economy**

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.

**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. *Merremiapeltata*.
* 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.

Some common invasive species in the Pacific Islands.

*Merremiapeltata* 

*Mikaniamicrantha Mile-a-Minute*

*Cassia tora or Sennatora Tora*

*Solanumtorvum Turkey Berry, Pico*

*SolenopsisinvictaLittle Fire Ant*

*Acridotherestristis Indian Mynah,*

*Achatinafulica*

*Giant African Land Snail*

**Exercise 1**

**1**. Identify invasive species that affect local primary production.

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**2**.Describe the problems caused by invasive species for local primary production.

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**3**. Analyse how invasive species affect local primary production.

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**4**. Evaluate the impact of invasive species (plant and animal/insects) on local primary production.

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