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Explorer

PIONEER

SPECIAL ISSUE:

WOMEN IN SCIENCE

Waiting to Be Discovered

Analyn Cabras looks for beetles in the Philippines.

By Brenna Maloney

Wildlife and Wild Places

LIFE SCIENCE

As you read, think about how one scientist's research can impact a field of study.

Analyn Cabras studies beetles. That's a big job. There are more than 400,000 species of beetles on Earth. They can be found on every continent but Antarctica. They can live where it's hot or cold. They can live where it's wet or dry. Some are really tiny. Others are as big as your hand!

Cabras looks for beetles on Mindanao. It is an island in the Philippines. Not much is known about the beetles that live here. This place has not been studied much.

Island Surprises

So far, Cabras' work has been full of surprises. She has found many beetles called jeweled weevils. She has also found many new beetles. "It feels like every time we go into the field, we discover at least one new species," she says. She and her team found four new species in one small stretch. That's a lot!

Know Your Scientist

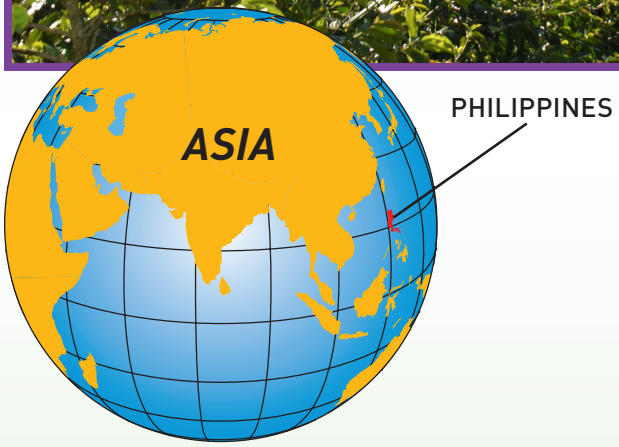
In her work studying beetles, Analyn Cabras plays many roles:

Biologist: an expert on living organisms

Coleopterist: a person who studies or collects beetles

Conservationist: a person who acts for the protection of the environment and wildlife

Cabras researches beetles in the Philippines.



Cabras looks at a beetle up close.

Ecologist: an expert in the relations of organisms to one another and to their natural surroundings

Taxonomist: a biologist that names and groups organisms into categories

Finding Something New

When Cabras thinks she's found something new, she stops. She also signals to her teammates to stop. She doesn't want to scare off a beetle. Then she takes pictures of the scene. "I usually take photos of their food plant and habitat," she says. This gives scientists like **conservationists** more information about the new beetle.

For example, many jewel weevils eat only certain plants. To protect these beetles, you also need to protect the plants they eat.

If she can, Cabras takes some beetles back to her lab. That way, other researchers can study them, too, and make new discoveries.

Weevil Wonders

Cabras thinks jewel weevils sparkle like gems. Their wings are brightly colored. They are orange or blue or red or even gold. These colors are a warning to predators. They mean: *Don't eat me! I taste bad.* Predators know to stay away.

These colors would mean a lot to her research. But, Cabras didn't know it at first.

This beetle became important to Cabras' research. She found a new species that looks like it.

Cabras uses a microscope to look at a beetle.

This beetle has the colors of a jewel weevil.

Mindanao Mimics

One day, Cabras spotted a beetle. It looked a lot like a beetle that she already knew. At first, she was fooled. Then she looked more closely. This beetle was a new species, but it had warning colors like the beetle she knew. It was a **mimic!**

Sometimes, a beetle will mimic another. Doing so helps its chances to survive. Predators see the beetle's warning colors as a sign of danger. They get scared off.

Testing a Theory

Cabras began to wonder if she was the only one to be fooled by this mimic. She tried an experiment. She made fake beetles out of clay. She gave them warning colors. She waited to see if predators would attack.

If the predator knew the warning colors, it did not attack. But, if the predator did not know the warning colors, it did. These predators had not yet learned to stay away.

Cabras has many more questions about the island's beetles and their mimics. She hopes to learn more.

This is one of the fake beetles Cabras used in her research.

Here are a few examples of beetles Cabras saw during her work. The mimics look like their models.

MODEL

MIMIC

MODEL

MIMIC

WORDWISE

conservationist: a person who acts for the protection of the environment and wildlife

mimic: to imitate or look like something else

Seeking Solut

Marissa Cuevas Flores worried about water pollution. She decided to do something about it.

As told to Simone T. Ribke

Q: Let's talk about environmental scientists. Why did you choose to become one?

Marissa Cuevas Flores created the company microTERRA.

As you read, think about how people are working to find new ways to protect Earth's resources and environments.

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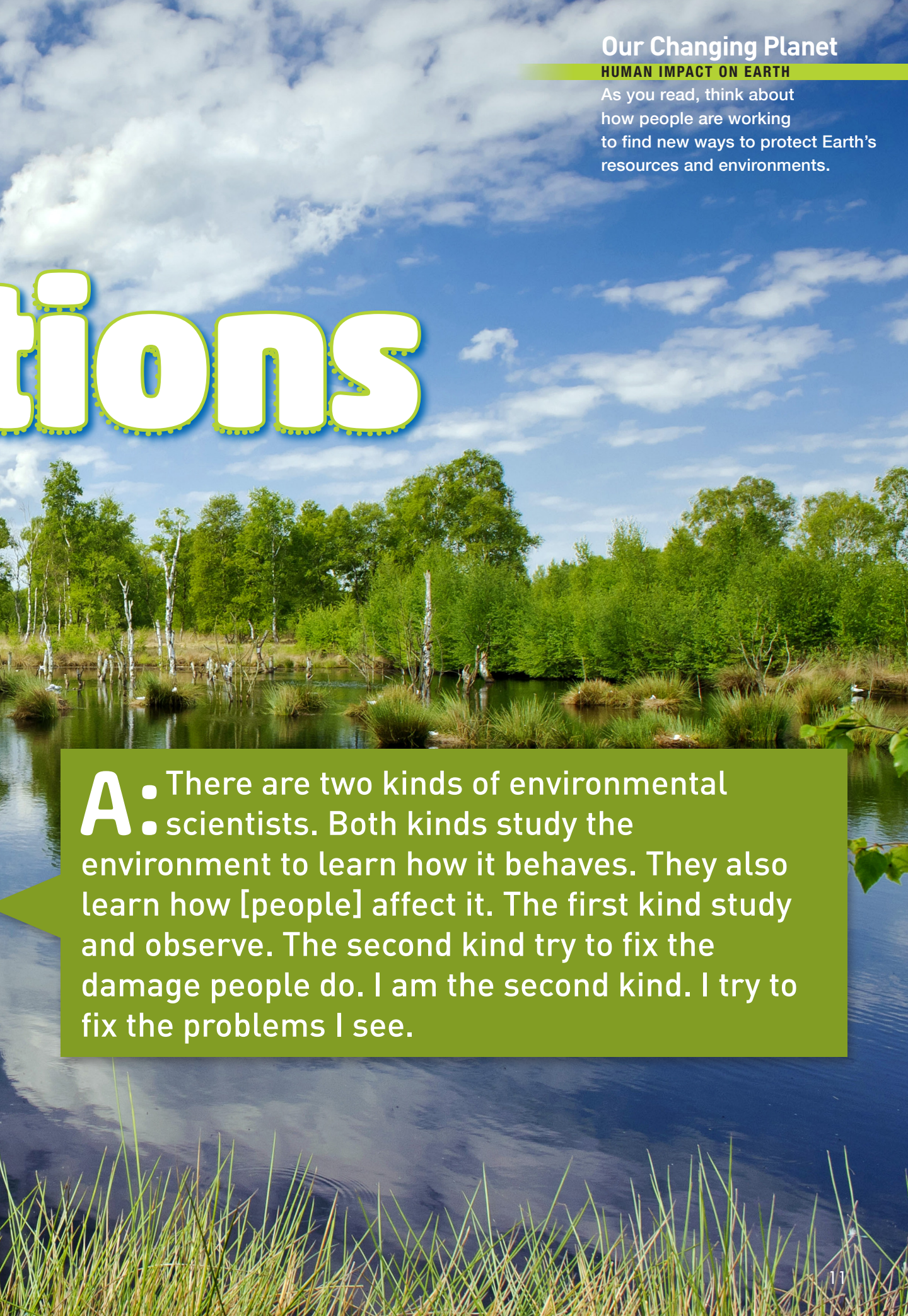


A: There are two kinds of environmental scientists. Both kinds study the environment to learn how it behaves. They also learn how [people] affect it. The first kind study and observe. The second kind try to fix the damage people do. I am the second kind. I try to fix the problems I see.

Q: What environmental problem did you want to solve?

A: Water pollution. Most of our freshwater is used for farming. But many farms use chemicals to cut down on weeds and pests. Water runoff from these farms can cause pollution. This **wastewater** can cause **dead zones.**

Q: What is a dead zone?

A: A dead zone is an area in a river, lake, or ocean that has low oxygen levels. Living things need oxygen. So, few things can live in these places. One thing that can are **microalgae.** They give off oxygen. They take in chemicals from wastewater.

Q: How will you tackle this?

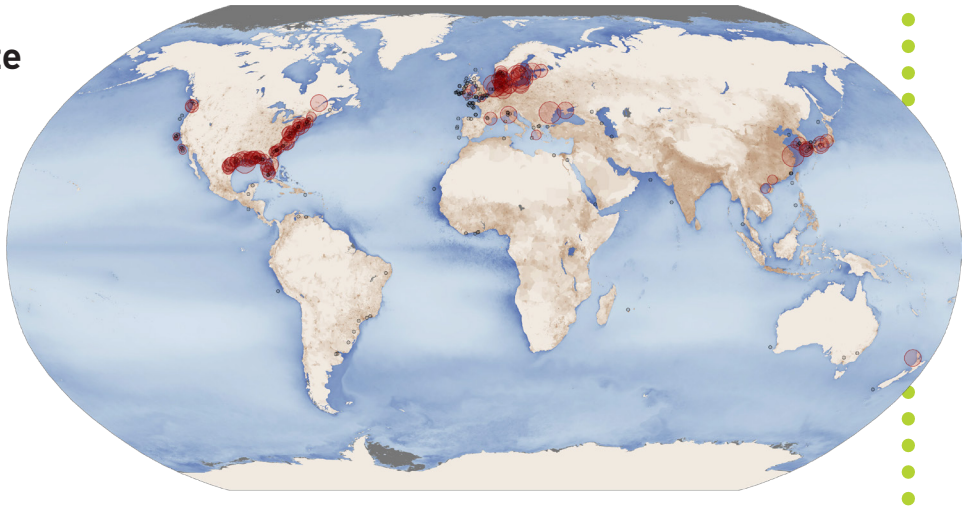
A: I found a way to **upcycle** wastewater and make it reusable. Microalgae can be used to clean polluted water in fish farms.

FAST FACT:
Each year, millions of tons of chemicals are used worldwide on our crops. Some of it gets washed into our waterways.

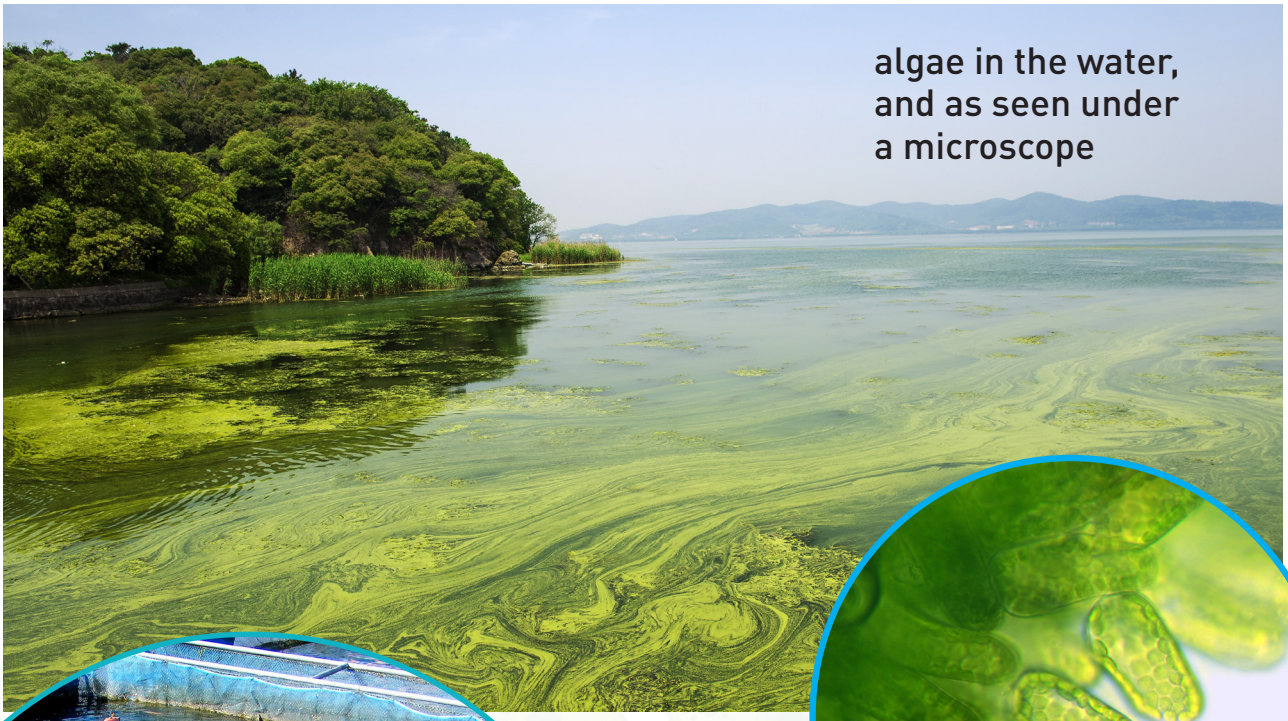
Dead Zones

Location and Size
(in square kilometers)

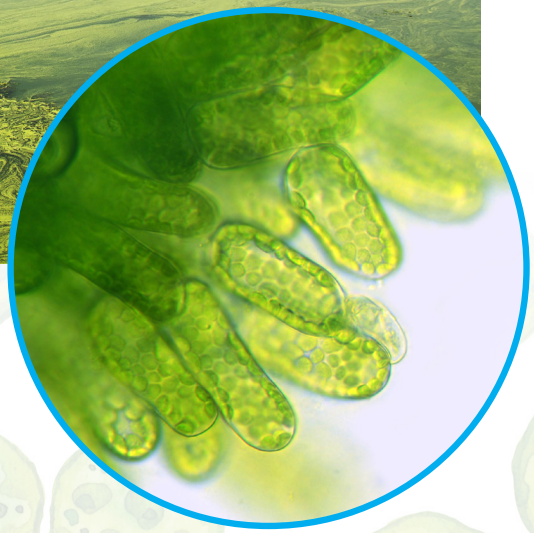
- size unknown
- 1 km^2
- 10 km^2
- 100 km^2
- 1,000 km^2
- 10,000 km^2



There are more than 500 dead zones worldwide.



algae in the water, and as seen under a microscope



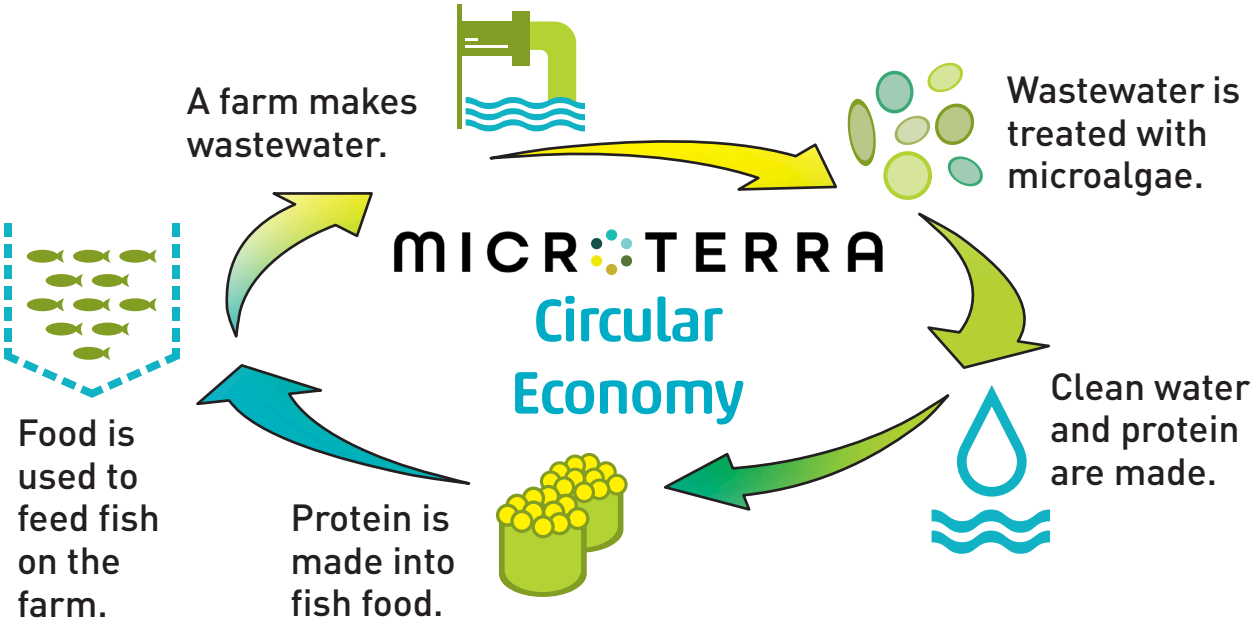
Fish farms are a source of water pollution.

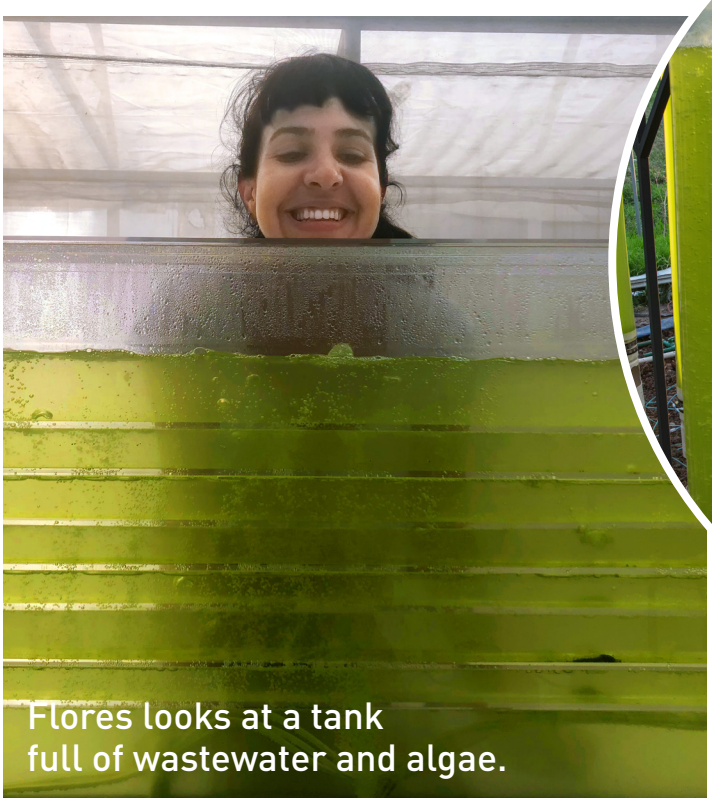
Q: What does microTERRA do?

A: We take fish farm wastewater and give it to our microalgae. This cleans the water so it can be reused. Our company uses a special kind of microalgae. Through **photosynthesis,** it makes protein. We use this protein to make food for fish.

Q: How do you grow microalgae?

A: We start in the lab. We know how microalgae grow. We make large amounts of it. Then we add it to wastewater. Wastewater is full of harmful bacteria. So, we use gloves and try not to touch our faces. We also wear masks and gowns. The microalgae clean the water and make the protein. The fish farmers then have clean water and food for their fish.





Flores looks at a tank full of wastewater and algae.

The microalgae clean the polluted water.

Q: Do you have any advice for future environmental scientists?

A: I would say to start on small projects. Think of different ways to reduce waste or pollutants. Every experiment counts! Tell others about what you are doing. Share ideas and solve problems together!

WORDWISE

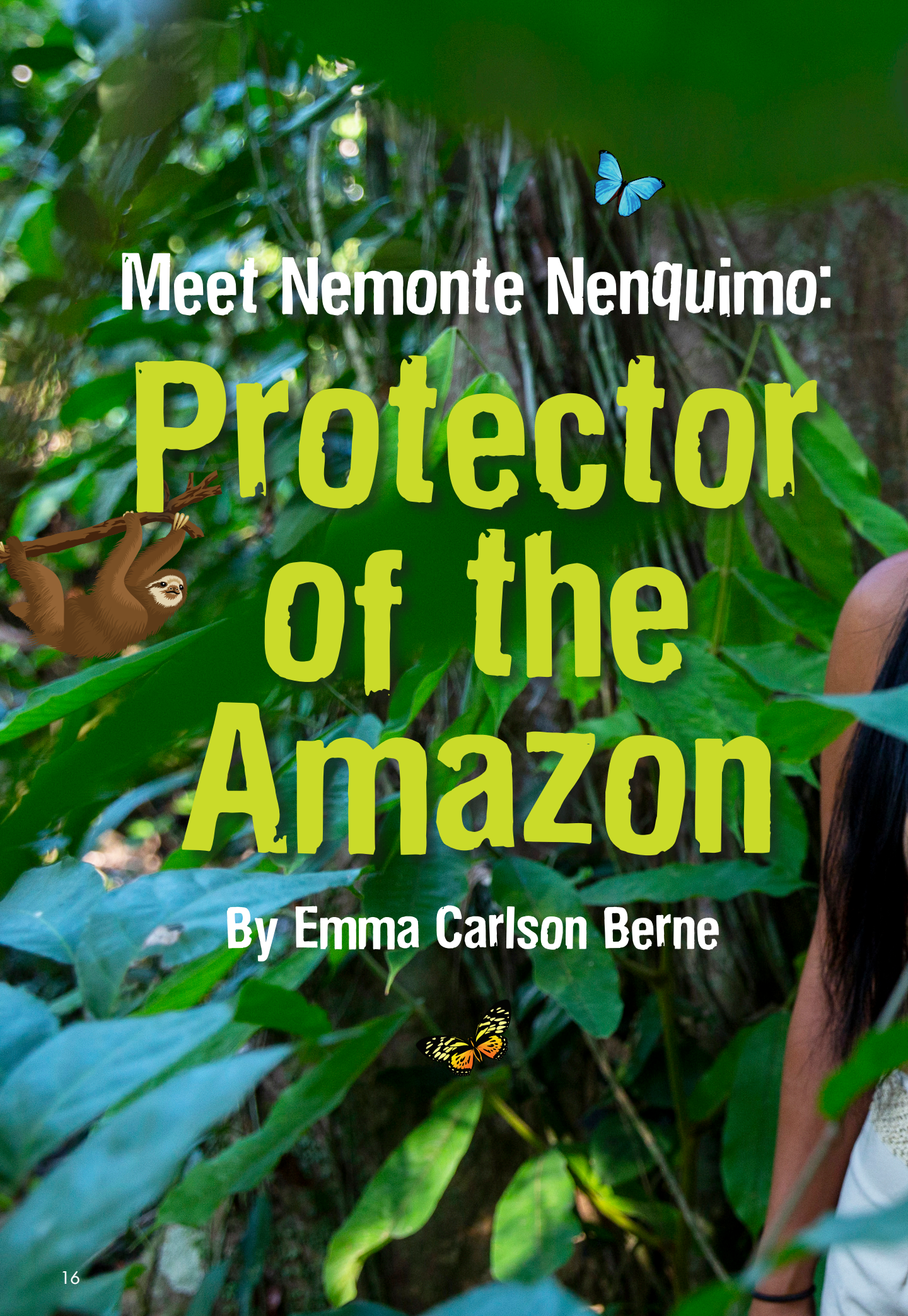
dead zone: a low-oxygen area in an ocean, lake, or river where few organisms can survive

microalgae: microscopic organisms typically found in freshwater and marine systems

photosynthesis: the process by which green plants use sunlight to make their own food

upcycle: to recycle a material to make a product that is more valuable than the original

wastewater: any water that has been contaminated by human use



Meet Nemonte Nenquimo: Protector of the Amazon

By Emma Carlson Berne

Human Journey

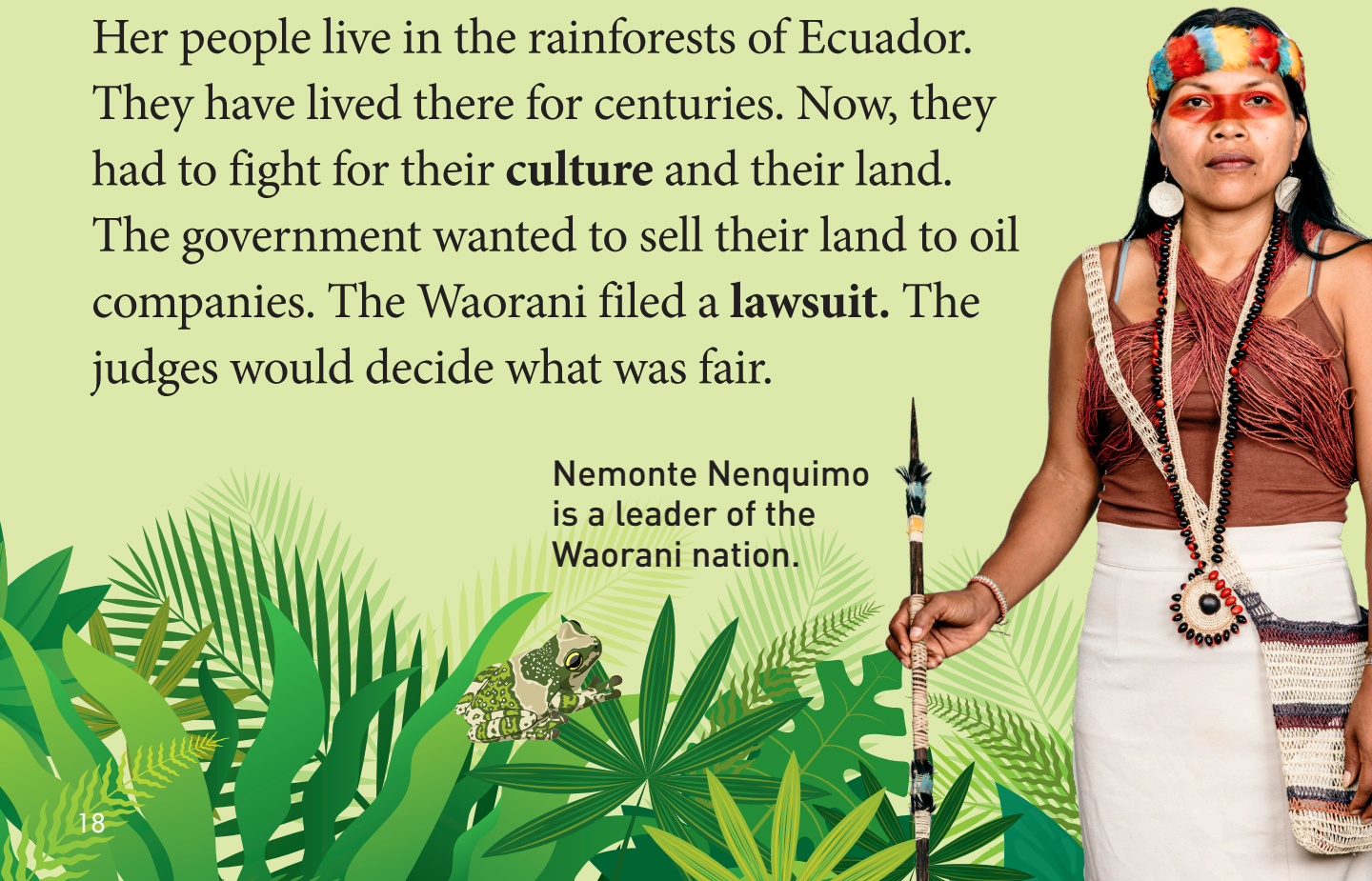
HUMAN-ENVIRONMENT INTERACTION

As you read, think about the connections the Waorani people have to their land.

Nemonte Nenquimo raises her fist in a sign of strength at the start of the court hearing.

The courtroom was crowded. Nemonte Nenquimo stood under its harsh lights. Her face was streaked with red paint. She wore a crown of feathers. Three judges sat before her.

Nenquimo is a member of the Waorani nation. Her people live in the rainforests of Ecuador. They have lived there for centuries. Now, they had to fight for their **culture** and their land. The government wanted to sell their land to oil companies. The Waorani filed a **lawsuit.** The judges would decide what was fair.



Nemonte Nenquimo is a leader of the Waorani nation.

A Rainforest Home

The Waorani nation is a group of **indigenous people.** Their land covers millions of acres of rainforest. Many birds, mammals, and reptiles live here. The Waorani are hunter-gatherers. Their lives are connected to the rainforest. They do not have much contact with the outside world.

Yet, the outside world wants something from the Waorani. Oil companies want their land.

The government tried to sell off their land. The Waorani knew they must fight to keep it.

The Waorani live in the Amazon rainforest.

A Leader for Her People

Nemonte Nenquimo was born and raised in the Waorani culture. Her grandfather taught an important lesson. He taught her that their land must always be protected.

Nenquimo's grandmother taught her, too. Waorani women are the caretakers of the forest. They watch over the plants and animals. They tell the hunters where to hunt and for which animals. Nenquimo learned all of these things.

She helped the elders make a map of their land. It showed special places. It showed where animals live. It showed where fruit trees grow. The map showed their strong relationship to the land. When this land becamed threatened, her people needed a leader. They chose her.

The Waorani filed their lawsuit. They said that the government could not sell their land. It did not have their permission. The Waorani did not know if they would succeed. But, they knew they had to try.

Nenquimo speaks to reporters about the court case.

In Court

Hundreds of Waorani people marched through the streets. They wore traditional clothes made of palm leaves. Their faces and arms were covered with paint used for battle.

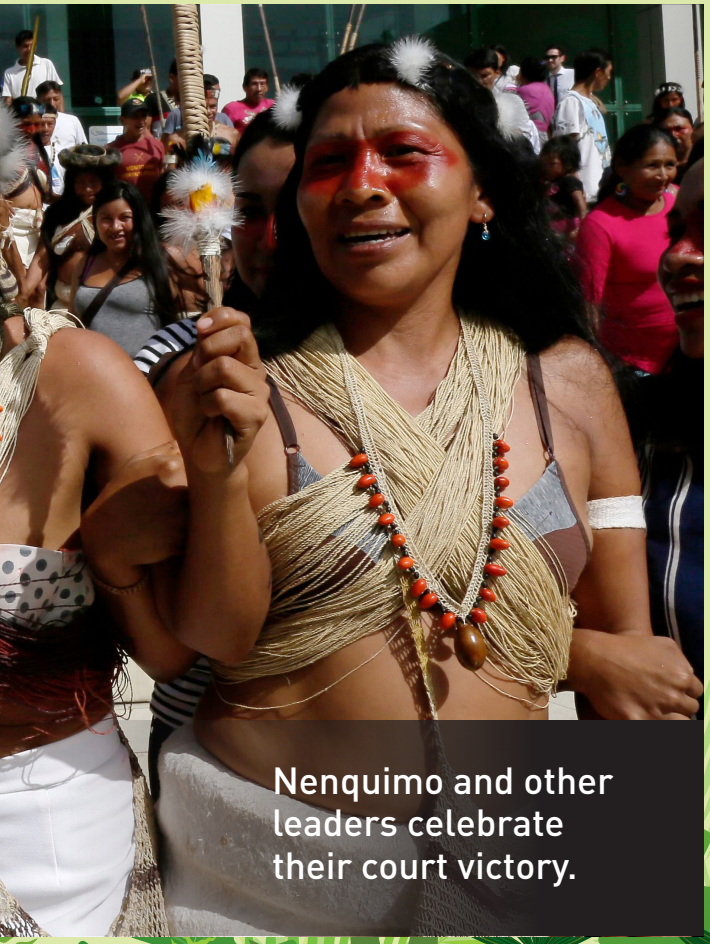
As they walked to the courthouse, they linked arms. They sang their traditional songs. They wanted people to see their pride in their culture. Nenquimo said she felt like a warrior.

Inside, the Waorani presented their case. They showed the judges the map they had made. They talked about their rainforest home.

The Ruling

At last, it was time to hear the judge's decision. One judge spoke for a long time. He said the government had not tried to understand the Waorani or their culture. He understood. The Waorani did not want to sell their land. He announced the court's decision. The Waorani's land was to be protected. They won!

The room erupted in song and celebration. Nenquimo felt happy and proud of their victory. And their way of life could continue.



Nenquimo and other leaders celebrate their court victory.

WORDWISE

culture: a pattern of behavior shared by a society or group of people; many different things make up a society's culture. These things include food, language, clothing, tools, music, arts, customs, beliefs, and religion.

indigenous people: the first people who lived in any region, before later immigrants

lawsuit: a process during which a disagreement between people or organizations is decided in court

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