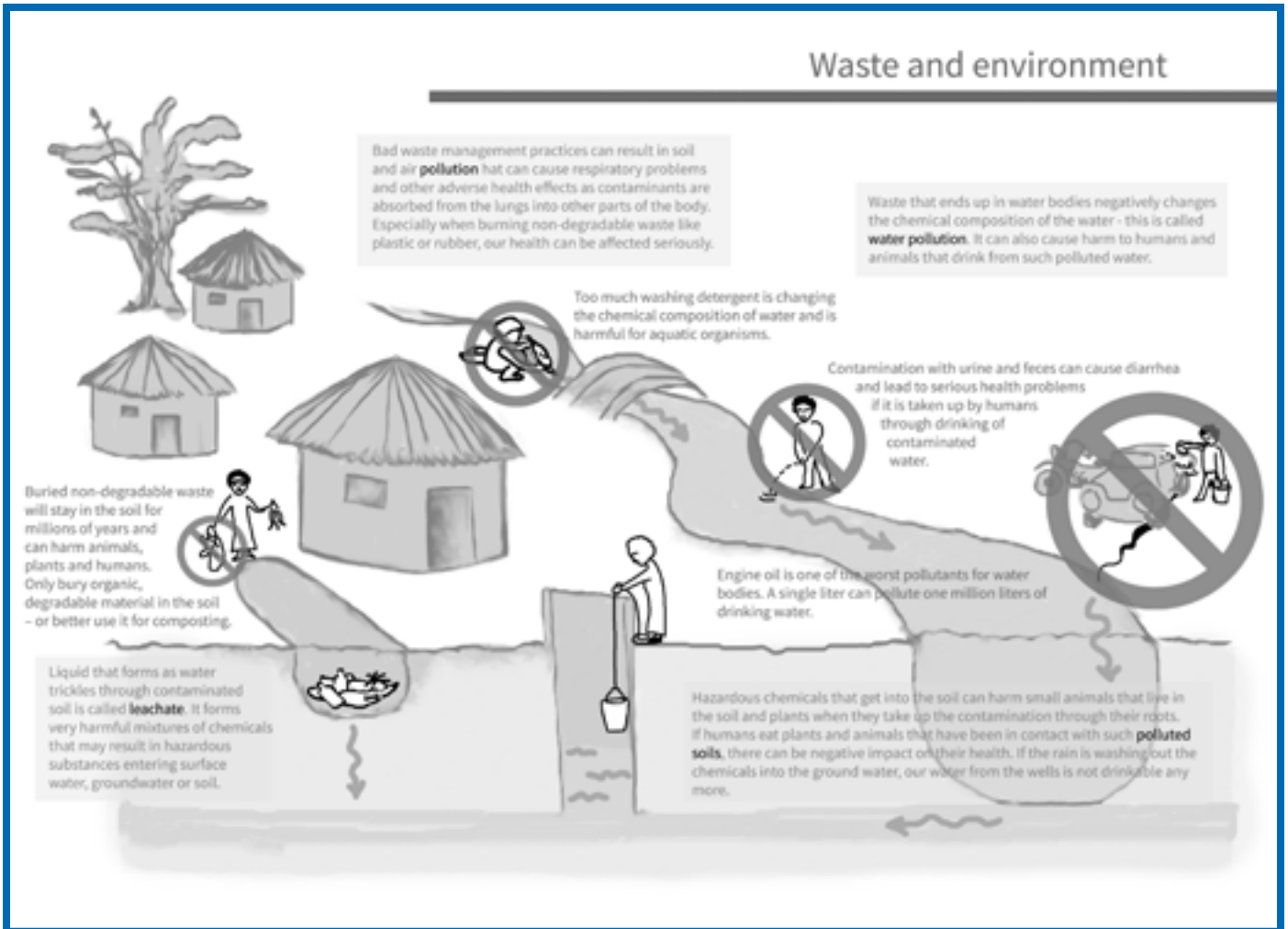


Waste and environment



MASTER COPIES

FOR THE SUPPORT OF BIODIVERSITY, NATURE CONSERVATION AND CLIMATE CHANGE EDUCATION IN SCHOOL CURRICULA IN THE KAFA BIOSPHERE RESERVE, ETHIOPIA

Example questions for the use in combination with the corresponding master copies

Importance of wild animals (p4 for teachers/ p5 for students)

Question: What do you think makes the pictured animals important? Write down at least two facts per animal.

Extra question: Do you know more wild animals? What makes them important?

Effects of overpopulation (p6 for teachers/ p7 for students)

Question: Write down at least 6 human needs that are satisfied by nature. With a growing number of human beings, the needs are causing negative effects on the natural resources. Write down at least 6 negative effects of overpopulation for our environment.

Extra question: There are negative effects of overpopulation that cannot directly be linked to human needs but still are caused by them. Can you explain how for example the need for energy or recreation can cause negative effects for our environment?

The water cycle (p8 for teachers/ p9 for students)

(Teachers: Prepare the list of words that the students are asked to fill in the blank spots of the drawing – evaporation x 4, ocean, condensing water vapor, cloud formation, precipitation, wetlands, lakes, groundwater.)

Question: Insert the provided words in the water cycle.

Extra question: Which reasons can you think of that have a direct impact on drought events to occur?

(Answers: Climate change, logging of forest, destroying of wetlands, sinking ground water level, sealing soil, unsustainable management of natural resources, inefficient use of water devices)

Waste and environment (p10 for teachers/ p11 for students)

Question: Four activities in the picture show wrong behavior. Which ones are those and why are they harmful for humans and environment?

Extra question: One behavior out of the four is harmful only if it is done in the wrong way. Which behavior is meant and what makes it harmful? (Answer: Human urine and feces, it becomes harmful if it is done outside of the toilets, by too many people, too close to human settlements.)

Forest food chain (p12 for teachers/ p13 for students)

Question: Explain with your own words the terms producer, consumer and decomposer. Write down at least two species per term.

Question: Add arrows that link the visualized environmental components and explain at least three of the links.

Extra question: Think about two more species in the forest and add them to the picture. Show their connections through arrows.

Extra question: How would you link humans in the food web?

Extra question: What would happen if there are too many consumers in a food web?

Benefits of forests (p14 for teachers/ p15 for students)

Question: There are 6 benefits visualized in the picture. They convinced the forest intruder to cut the trees. Which are the benefits? The small painted hints will help you identifying them.

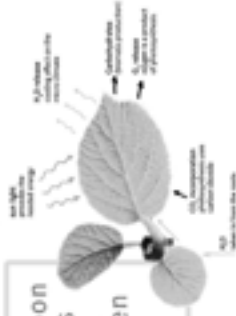
Extra question: Human need forest resources like wood, mushrooms and coffee. How can the forests resources be used and the forest ecosystem be protected sustainably at the same time? (Answer: By sustainable outtake)



• Forests keep the moisture from clouds and are important for maintaining the hydrological cycle.



• All trees and plants store carbon dioxide through photosynthesis (important for our climate) and at the same time produce oxygen (vital for humans and animals).



• Forests are home (habitat) for many plants and animals.



• The root system of forests prevents the soil from being washed away (erosion).



• Forests provide humans with renewable resources for example wood, fruits, honey or coffee.



• Forests are appreciated for their aesthetic and spiritual values, and are attractive for tourism.

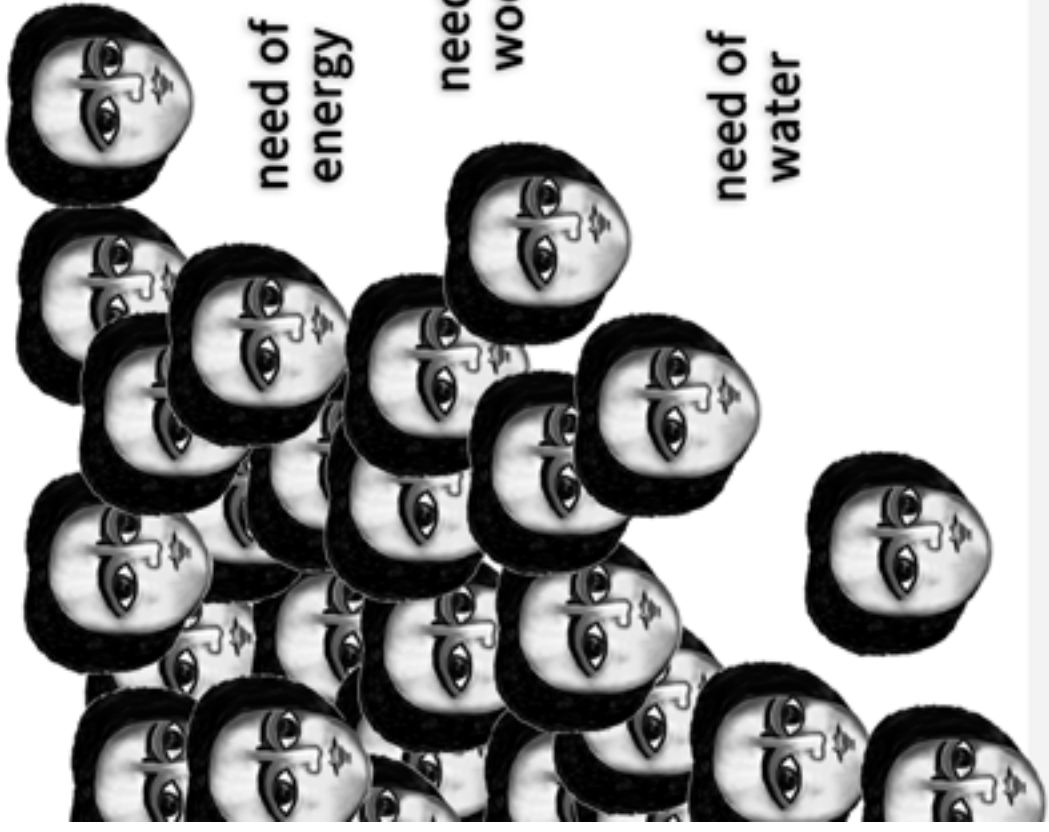


Benefits of forest



Benefits of forest

Effects of overpopulation



need of energy

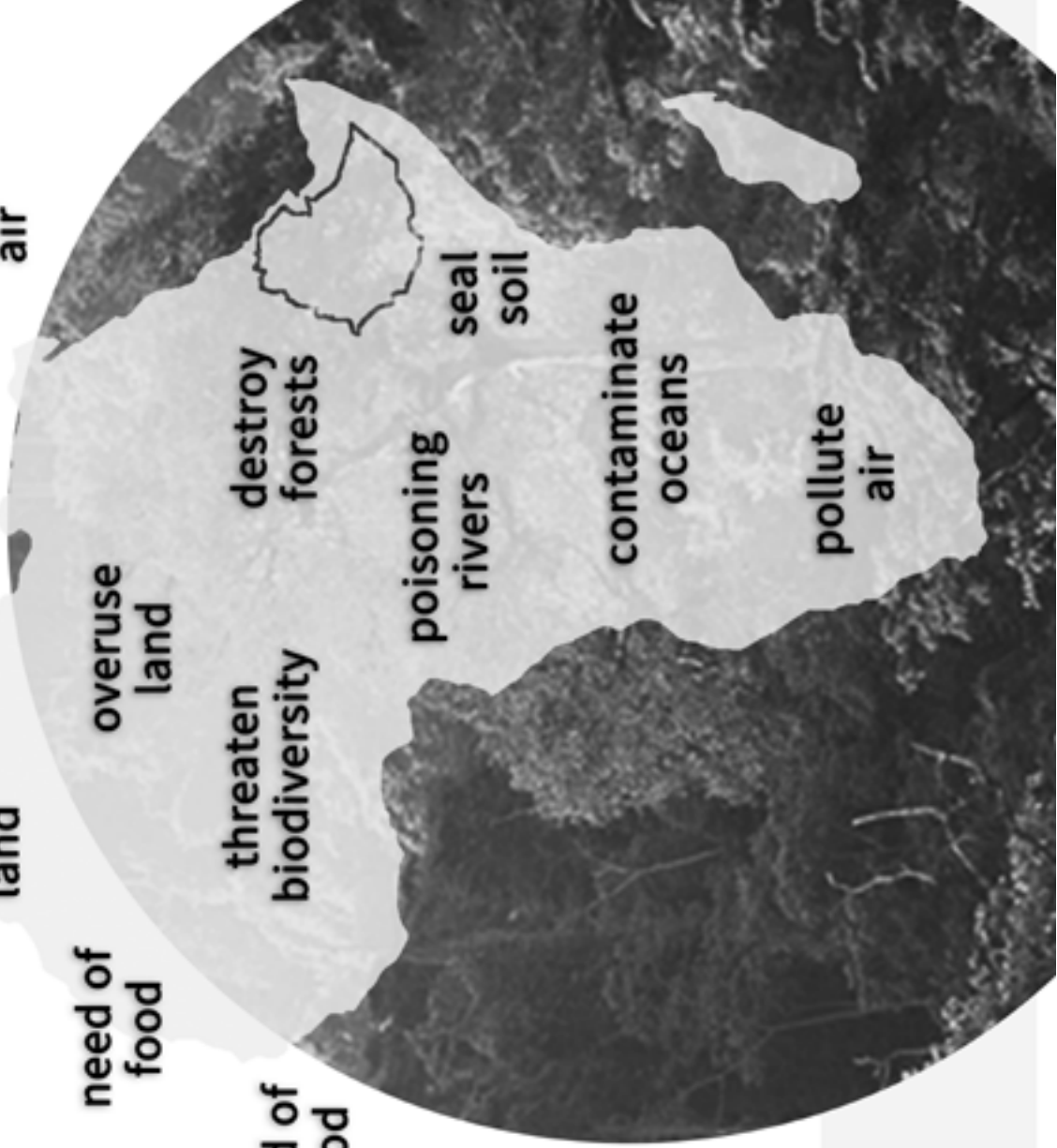
need of wood

need of water

need of land

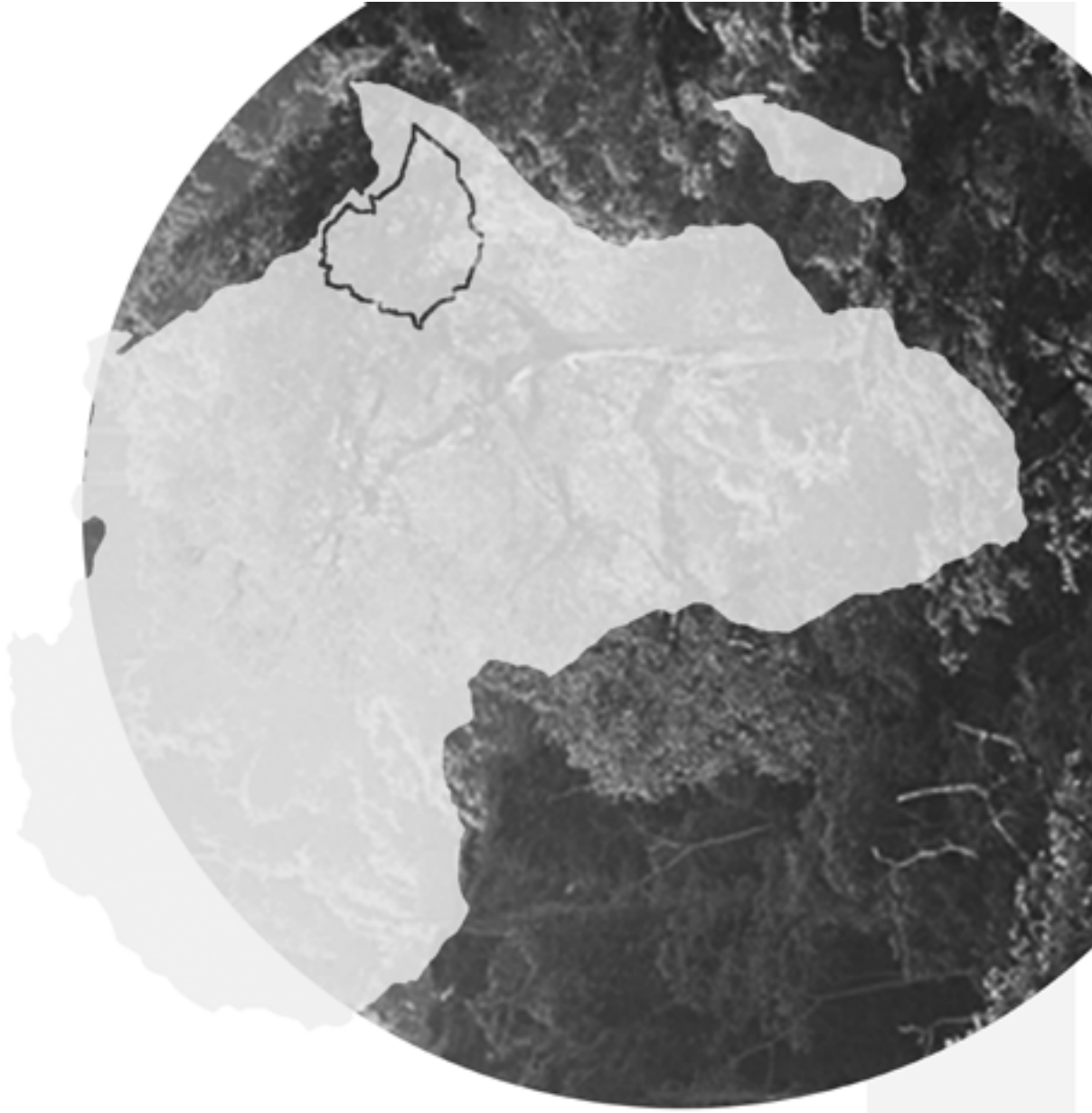
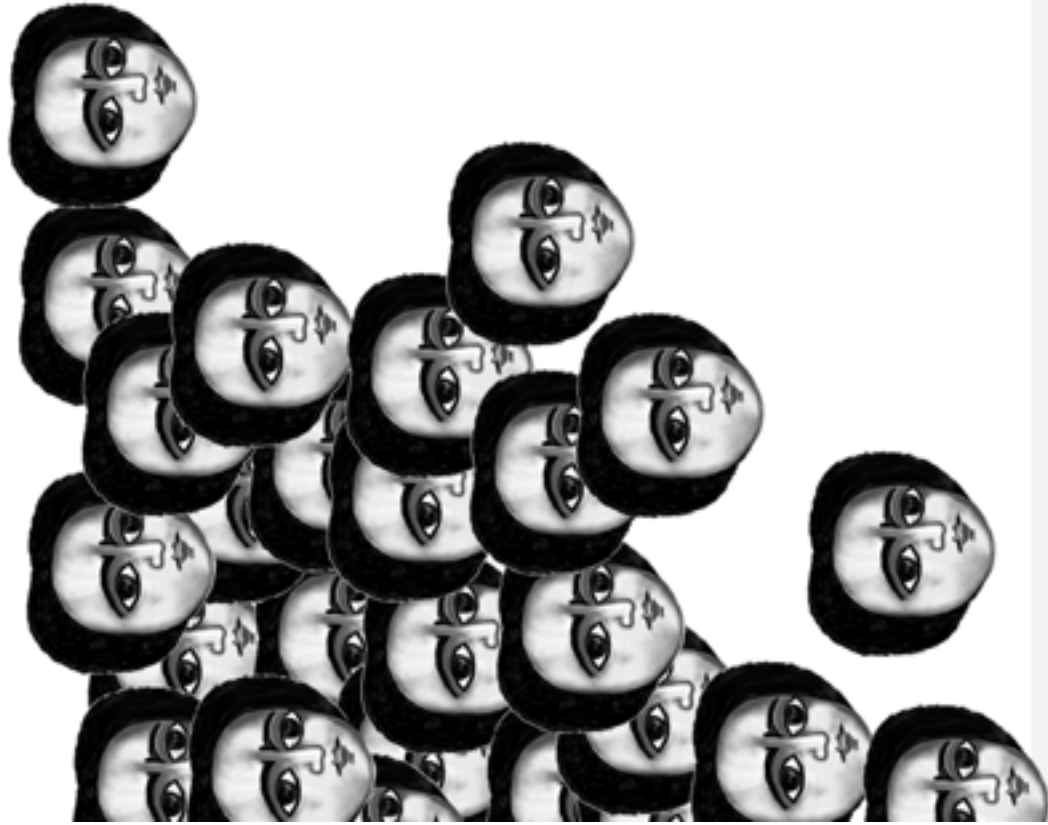
need for recreation

need of air



Humans and nature have lived in a balanced system of interaction over thousands of years. Whatever we need - our planet provides it. With our global population continuously growing, this balance is disturbed.

Effects of overpopulation



Humans and nature have lived in a balanced system of interaction over thousands of years. Whatever we need - our planet provides it. With our global population continuously growing, this balance is disturbed.

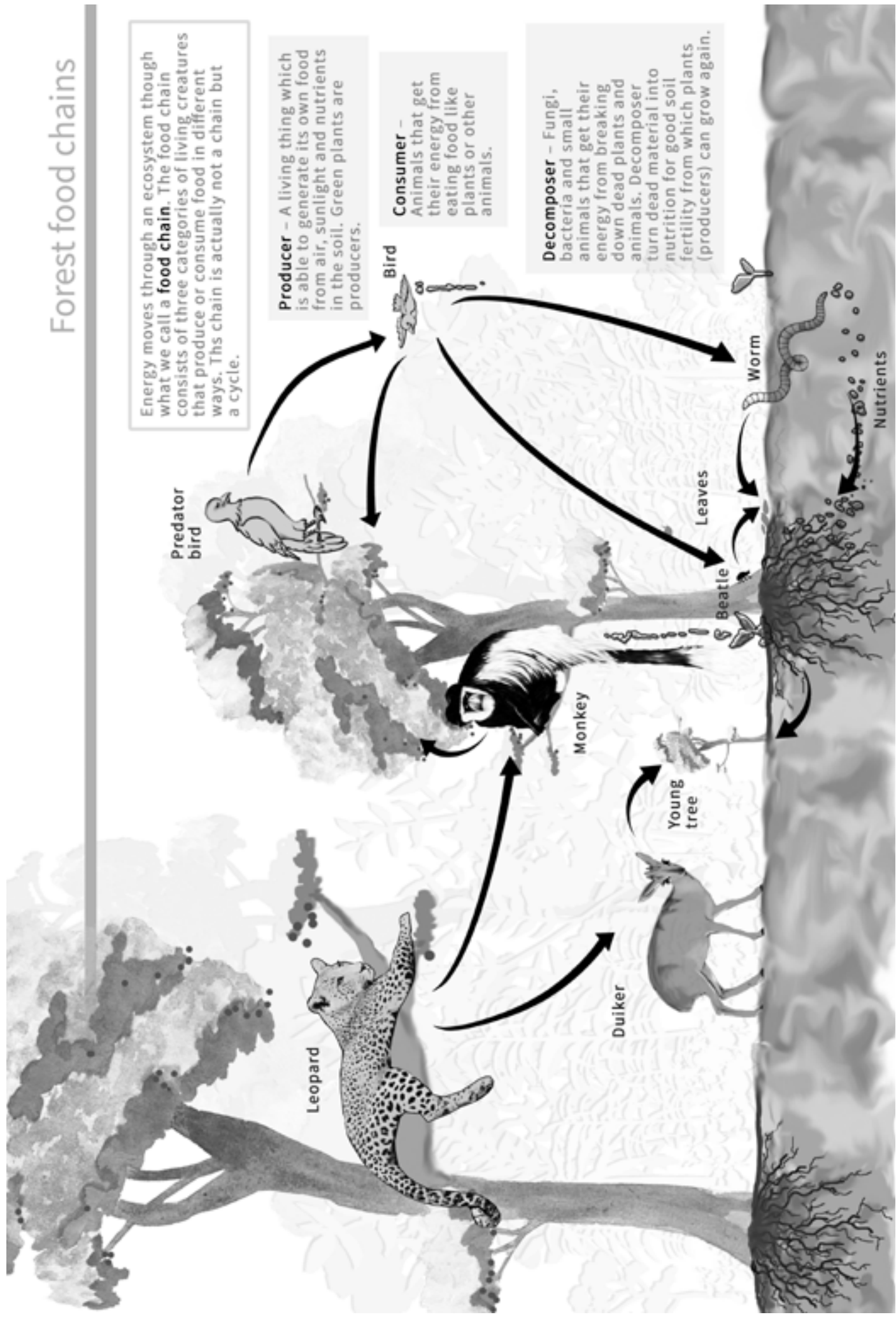
Forest food chains

Energy moves through an ecosystem through what we call a **food chain**. The food chain consists of three categories of living creatures that produce or consume food in different ways. This chain is actually not a chain but a cycle.

Producer - A living thing which is able to generate its own food from air, sunlight and nutrients in the soil. Green plants are producers.

Consumer - Animals that get their energy from eating food like plants or other animals.

Decomposer - Fungi, bacteria and small animals that get their energy from breaking down dead plants and animals. Decomposer turn dead material into nutrition for good soil (producers) can grow again.



Forest food chains

Energy moves through an ecosystem through what we call a **food chain**. The food chain consists of three categories of living creatures that produce or consume food in different ways. This chain is actually not a chain but a cycle.

Producer

Consumer

Decomposer

Predator
bird

Bird

Leaves

Worm

Nutrients

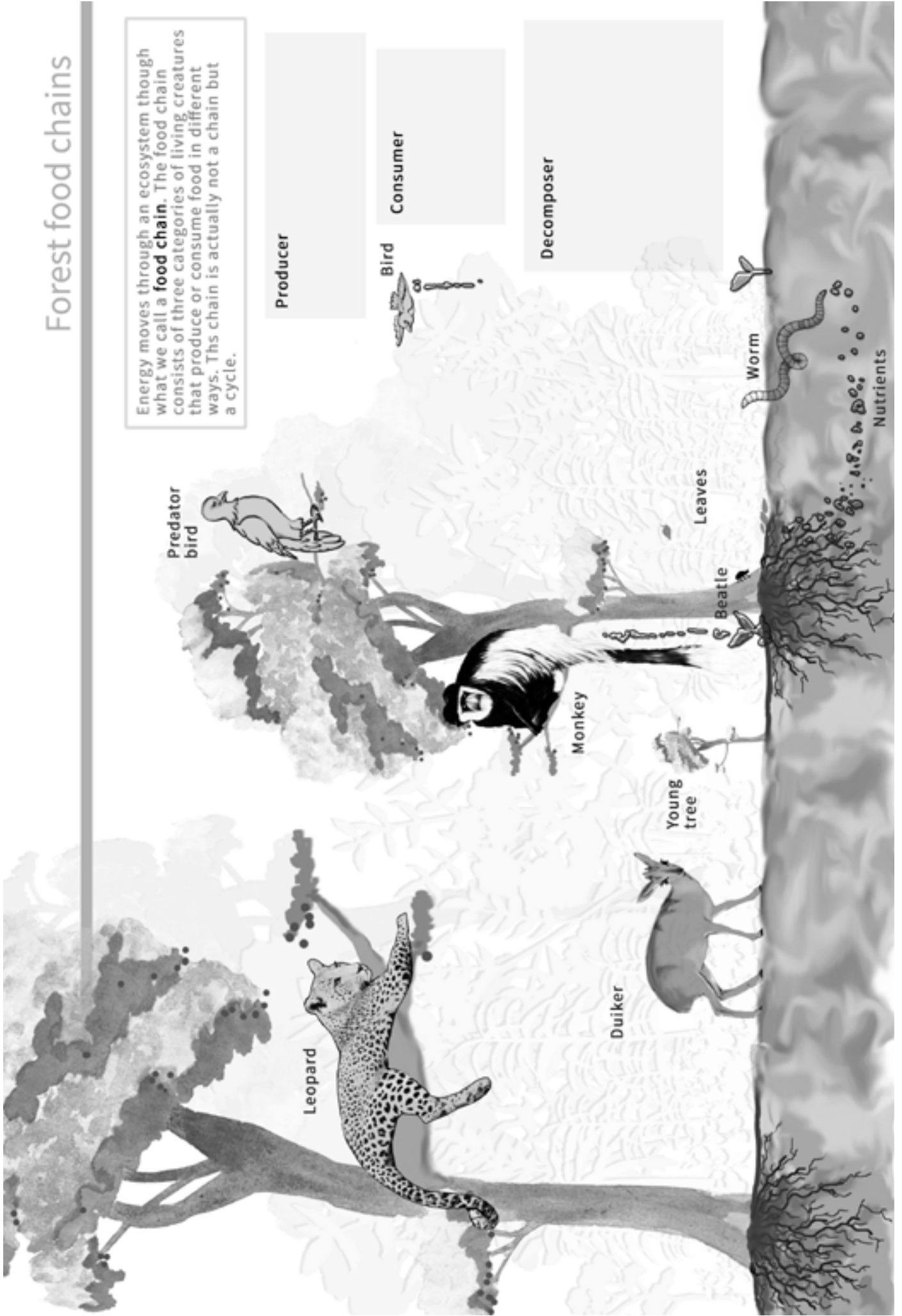
Monkey

Young
tree

Beetle

Leopard

Duiker



Importance of wild animals

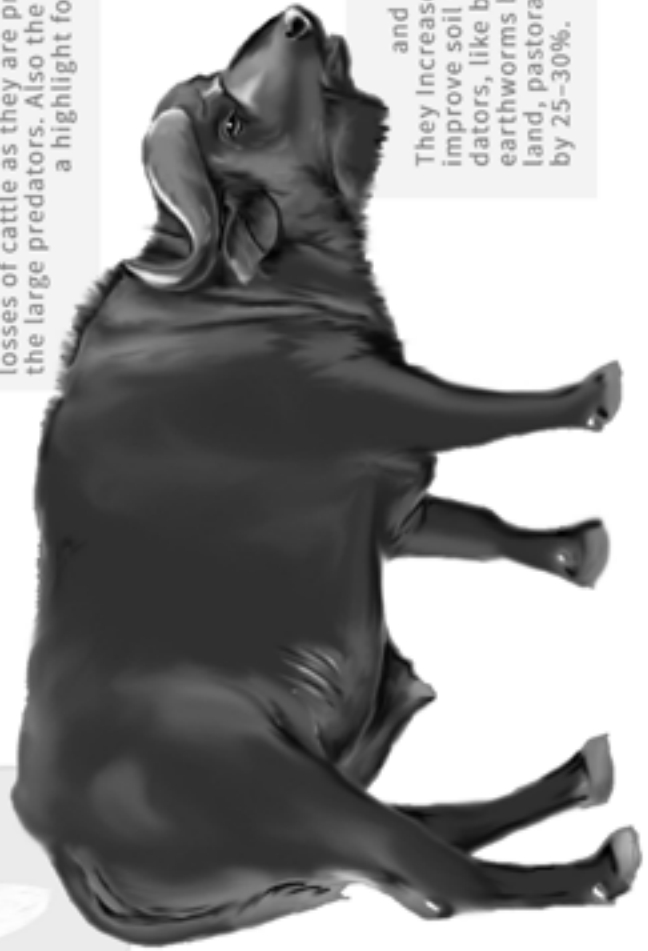


Bees are responsible for pollinating about one-sixth of the flowering plant species worldwide and approximately 400 different agricultural types of plant. Many seeds, fruits and berries eaten by birds and small mammals come from plants that are pollinated by bees, making them the provider of food and preserver of the biodiversity of our species. Nectar and pollen from flowering plants are the only food source for bees and are a delicious food source for humans in form of honey.

The **Colobus monkey** or primates in general play key roles in ecology as seed dispersers for many important tree and shrub species. Colobuses are important for seed dispersal through their sloppy eating habits, as well as through their digestive systems. They are prey for many forest predators and a valuable tourist attraction.



African buffaloes are widespread in Sub-Saharan Africa and play a pivotal ecological role, being bulk feeders in the food chain. They are the main prey of lions and their presence prevents losses of cattle as they are preferred by the large predators. Also the buffalo is a highlight for tourists.



Lions play an important role in helping to regulate the food chain, some herbivore species, such as zebra and buffalo. Without lions to control them, these species can out-compete other animals, causing their extinction and reducing biodiversity. Lions are one of the biggest attraction for tourists and can therefore be perceived as a valuable economic asset.

Earthworms, along with bacteria and fungi, decompose organic material. They increase the nutrient availability in the soil, improve soil structure, and provide food for predators, like birds and specialized snails. Once earthworms become established on agricultural land, pastoral productivity increases by 25-30%.



Importance of wild animals



Bees



The Colobus monkey



Lions

African buffaloes



Earthworms



Waste and environment

Bad waste management practices can result in soil and air **pollution** that can cause respiratory problems and other adverse health effects as contaminants are absorbed from the lungs into other parts of the body. Especially when burning non-degradable waste like plastic or rubber, our health can be affected seriously.

Waste that ends up in water bodies negatively changes the chemical composition of the water - this is called **water pollution**. It can also cause harm to humans and animals that drink from such polluted water.

Too much washing detergent is changing the chemical composition of water and is harmful for aquatic organisms.

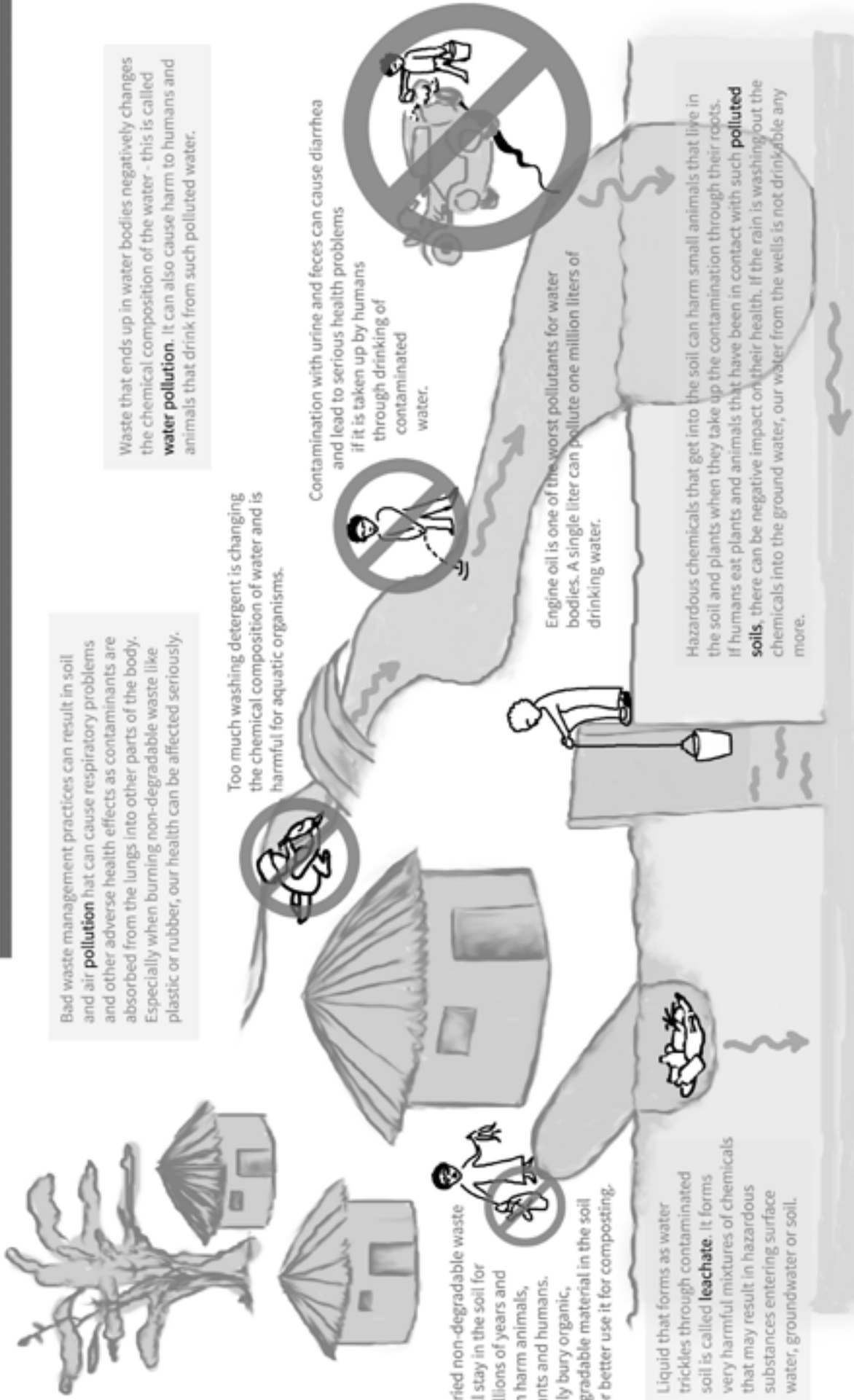
Contamination with urine and feces can cause diarrhea and lead to serious health problems if it is taken up by humans through drinking of contaminated water.

Buried non-degradable waste will stay in the soil for millions of years and can harm animals, plants and humans. Only bury organic, degradable material in the soil - or better use it for composting.

Liquid that forms as water trickles through contaminated soil is called **leachate**. It forms very harmful mixtures of chemicals that may result in hazardous substances entering surface water, groundwater or soil.

Engine oil is one of the worst pollutants for water bodies. A single liter can pollute one million liters of drinking water.

Hazardous chemicals that get into the soil can harm small animals that live in the soil and plants when they take up the contamination through their roots. If humans eat plants and animals that have been in contact with such **polluted soils**, there can be negative impact on their health. If the rain is washing out the chemicals into the ground water, our water from the wells is not drinkable any more.



Waste and environment

