SPARK questions about **food** DIVERSITY

project **AGRICULTURE**

What **factors** are required for **sustainable growing environments?**

Food diversity depends on healthy growing environments.

- [ ] I will use information and **INVESTIGATE FURTHER** questions to help me identify a project question I want to investigate for an food **DIVERSITY** project.
- [ ] I will identify what I need to know more about.

growing environments meet the needs of plants

Agriculture is affected by – and affects – natural environments. Crops grow in natural environments that have been modified to meet their specific needs.

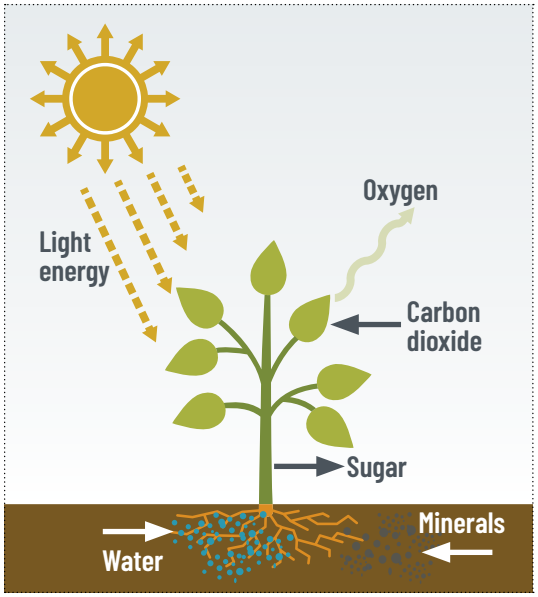
However, the features of natural environments that are used to create fields, plant seeds and harvest crops also have an effect on what and how crops are grown.

Just like all plants – crops need water, light and nutrients.

Air is essential for crop plant growth and survival. Air provides plants with carbon dioxide. Plants use carbon dioxide during photosynthesis. Water and light are also required.

Photosynthesis is a chemical reaction that takes place inside a plant, producing the food the plant needs to live and grow. Photosynthesis takes place in the leaves of the plant.

Plants also need air within the soil. Oxygen in the soil helps the roots of a plant grow and thrive. The temperature of the air matters. Some prefer growing in cooler areas, while others need warm air.



The environmental factors illustrated in the grid below influence the growing environment of crops.

The physical characteristics of the land include its **terrain** – flat, hilly, mountainous – and **bodies of water**. The terrain and water sources influence the types of plants that grow. Average temperatures and precipitation are influenced by elevation.

Soil is composed of eroded rock, mineral nutrients, decaying plant and animal matter, water and air. The nutrients and moisture in soil affect plant growth, variations and adaptations.

Weather and climate are related, but they are **not** the same thing. **Weather** is what happens every day in our atmosphere. **Climate** describes what the weather is like over a long period of time in a specific area. Climate determines the types of plants that can tolerate the temperature range, moisture levels and humidity.

Terrestrial plants are anchored to soil through their roots, through which they absorb water and nutrients.

Biological factors, such as **organisms** like earthworms and insects as well as **microorganisms** like bacteria and fungi, affect soil structure and its ability to hold water.

Some species of wildlife and insects can serve as pollinators. Others can be considered pests, as they can feed on and damage plant parts.

environments can be modified to create growing environments for crops

Four main environmental factors have a strong influence on crop agriculture – the terrain, climate, soil type and water content of the soil. **The combination of these four factors determine the types of crops that grow best.**

INVESTIGATE FURTHER

How does the location and environments in which crop plants are grown affect decisions farmers make as they grow crops? In what ways do the differences between weather and climate need to be considered by farmers?

Most crops are grown on level, flat land, where the temperature, precipitation and soil conditions support the plants' needs. If an area is too steep, too wet or dry or has poor soil conditions, farmers can apply different practices to till the soil for planting, add water and increase nutrients in the soil.

Farmers also work to protect the natural features of their environments. Wildlife areas and wetlands interact to provide benefits to agricultural growing environments.

INVESTIGATE FURTHER

How do environmental factors that affect natural plant growth apply to crop plants?

Pay dirt

Farmers live on the land where they grow food, and they need their soil healthy for environmental and economic reasons. [Daryl Tuck, a farmer from Vegreville, and his] family have been on the land for 100 years, and by managing his farmland properly, he'll ensure that it will be passed on to future generations.

Responsible fertilizer use is part of making agriculture more sustainable. Using fertilizer is one way that farmers can make the most of their land and use it effectively.

[Len Kryzanowski, director of environmental strategy and research with Alberta Agriculture and Forestry,] has conducted studies about fertilizer use in the province and has found Alberta farmers are using fertilizer responsibly. "In the vast majority of the province, the nutrient management is very good," he said.

...Using fertilizer responsibly allows farmers to leave their land viable for wildlife habitat and recreational activities. Farmers are also consumers, and they read the same articles about environmental degradation and have the same worries as urban dwellers. They want to preserve their land and the health of the environment.

"You can talk to any farmer in Alberta and ask them where the most beautiful places are on their farm, and they can show you where the ducks nest and the deer cut through," said [Michelle Nutting from Agrium]. "There's a lot of awareness of the environment on the farm and they really take care of that."

Wilson, T. (October 4, 2016). Pay Dirt. Grains West: Online. https://grainswest.com/2016/06/pay-dirt/

INVESTIGATE FURTHER

In what ways can farmers modify or control natural environments and conditions to maximize crop yields and quality?

How can disruptions in growing environments – like those caused by climate change – affect the growth rate, yield and quality of crop plants?

INVESTIGATE FURTHER

How are growing environments modified and adapted for crop production? What are the benefits and risks to plants as well as the environment?