STUDENT GUIDE
EXPLORE 2 LESSON 17

Food and Agriculture Center for Science Education

Part 1: Our Motivation

Record what we were trying to figure out that led to this investigation.

- What is the significance of the changes in biodiversity from clearing land for crops for dairy feed?
- Why is it important for humans to have more plants and animals?
- Why does biodiversity matter?

Part 2: Obtaining Information from Texts

Using three of the four provided articles, find evidence to help you answer the lesson question, ""What else is changing biodiversity? Why do these changes matter to humans?" Use the graphic organizer below to record your findings.

1. What is Happening to Agrobiodiversity?
2. The Biodiversity That is Crucial for Our Food and Agriculture is Disappearing by the Day
3. Increasing Farm Biodiversity
4. Agroecosystems and Biodiversity

Article	Record two specific pieces of evidence from the article that help you answer the lesson question:	Record two specific reasons why this article is useful/not useful for answering the lesson question:
What is Happening to Agrobiodiversity?	The article mentions the loss of forest cover and wild areas, which increases the loss of biodiversity.	Useful rapid expansion of industrial agriculture. Specifically, the production system

	Confirmed the facts that much of agriculture is monocropped-and the whole agriculture system relies on a very small number of crops.	changes that result in less diversity in crops/animal breeds. Reduced integration of livestock in arable production.
The Biodiversity That is Crucial for Our Food and Agriculture is Disappearing By the Day	Less biodiversity means that plants and animals are more vulnerable to disease and pests. 91 countries in the biodiversity study report wild food species and species that contribute to ecosystem service vital to food and agriculture (like pollinators, soil organisms, and natural enemies of pests) are rapidly declining.	Biodiversity is critical for safeguarding global food security, underpinning healthy/nutritious diets, and improving livelihoods. Largest driver of biodiversity loss is changes in land/water use, management, pollution, overexploitation and overharvesting.
Increasing Farm Biodiversity	This article focuses on ways to improve biodiversity on farms and why it is important. It isn't super helpful in proving that crops being grown to feed cattle reduce biodiversity. It does share many factors that remind me that biodiversity is important (encourages beneficial organisms, improves soil, spreads economic risk, can break insect/disease/weed cycles.	Intercropping-two or more crops grown in close proximity can have positive impacts. Agrees that agriculture terrain is a component in the loss of biodiversity.
Agroecosystems and Biodiversity	The loss of biodiversity can have negative ecological and economic impacts. Farmers can lose earnings when biodiversity is threated. The article points to many options for humans to increase biodiversity.	Management of agricultural systems can dramatically affect overall levels of biodiversity. Pesticides, fertilizers, and soil disturbance contributes to habitat loss, fragmentation, and species invasion.

Which of the sources provided the most relevant evidence to answer our lesson question? Which source was most useful in doing so? Why do you think so?

The Food and Agriculture Organization article 2 provided the most relevant evidence to answer the question "why does having more or less biodiversity matter to humans." The reason I think that is because it gave a large, detailed list of harm biodiversity loss does and how humans actions are responsible for it. I also think that the University of Tennessee article helps describe how increased biodiversity is beneficial, such as by having negative ecological and economic impacts. Farmers can lose earnings when biodiversity is threated.

Based on the evidence you found, summarize what you now think about how the dairy system impacts biodiversity and why it matters.

The design was created so that the dairy farmer could feed their cattle herd and that impacted the plants and animals in that area by taking away their habitat. That habitat loss is playing a bigger part in the story of human

diets/safety/livelihood because the loss of habitats leads to less biodiversity which could have severe impacts on our food system.

Do you think the design of the dairy system was intended to have the impacts you read about? Why or why not? What unintended effects is it having on plants, animals, humans, and communities? Cite evidence from the articles to support your response.

The construction of the diary system was not necessarily intended to have negative effects on biodiversity and consequently on humans. The system was designed to efficiently produce dairy products, but it is having unintended consequences such as soil disturbances, declines in wild food availability, and wild pollinators. The article by the FAO titled, "The biodiversity that is crucial for our food and agriculture is disappearing by the day." states that "Many associated biodiversity species are also under severe threat. These include birds, bats and insects that help control pests and diseases, soil biodiversity, and wild pollinators – such as bees, butterflies, bats and birds."

Part 3: Consensus Building

As a class, you will discuss what you learned from the articles in Part 2. As your classmates are sharing their findings from the article, write in the chart below any new ideas you hear from the conversation.

- Certain agriculture industry norms that have negative effects on biodiversity (pesticides, fertilizers, soil disturbance, land fragmentation).
- Biodiversity is critical for food security, healthy/nutritious diets, and improving livelihoods in people.
- Biodiversity is important to animals, plants, and people.
- Less biodiversity means that plants/animals are more susceptible to disease and pests.