

Lesson Plan: Teaching “Climate Change and Food Security” and “Climate Change and Agriculture”

As a **high school** or **undergraduate Social Sciences** or **Environmental Sciences** teacher, you can use this set of computer-based tools to help you in teaching topics such as **Food Security**, **Agriculture**, **Climate Change and Food Security**, and **Climate Change and Agriculture**.

This lesson plan helps students understand the various aspects of food security, and the challenges faced in food security and agriculture at different locations across the world. The activities explore the two-way relationship between agriculture and climate: the impact of food production on the climate, and the possible effects of climate change on agricultural production through location-specific examples.

Thus, the use of this lesson plan allows you to integrate the teaching of a climate science topic with a core topic in Social Sciences or Environmental Sciences.

Use this lesson plan to help your students find answers to:

- *Define food security.*
- *What are the climate-related factors that influence crop yield?*
- *How might agricultural practices and livestock farming contribute to climate change?*
- *How could climate change affect global food security?*
- *Identify actions that could reduce the impact of food production on climate change.*

About the Lesson Plan

Grade Level

High school, Undergraduate

Discipline	Social Sciences, Environmental Sciences
Topic(s) in Discipline	Food Security, Agriculture, Climate Change and Food Security, Climate and the Food System, Climate Change and Agriculture
Climate Topic	Climate and Food, Climate Change and Food Security, Climate Change and Agriculture
Location	Global, Africa
Access	Online, Offline
Language(s)	English
Approximate Time Required	90 – 130 min

1 Contents

- 1. Micro-lecture (video) (~26 min)**

Two micro-lectures that introduce the concept of food security, explain the factors that impact food security globally, and provide examples to explain the link between food production and climate change.

<https://www.coursera.org/learn/future-of-energy/lecture/5nlWc/climate-change-and-food-security-part-1>

<https://www.coursera.org/learn/future-of-energy/lecture/cdxIG/climate-change-and-food-security-part-2>
- 2. Teaching Module (high school) (~55 min)**

For high-school level:

A teaching module to explain the relationship between the food system and climate change, and to determine actions that can reduce the impact of the food system on climate change.

http://www.foodspanlearning.org/_pdf/lesson-plan/unit2/lesson5-climate-lessonplan.pdf

http://www.foodspanlearning.org/_pdf/lesson-plan/unit2/lesson5-climate-slides.pdf

http://www.foodspanlearning.org/_pdf/lesson-plan/unit2/lesson5-climate-handoutsandguides.pdf

OR

**Classroom/Laboratory
Activity (undergraduate)
(~90 min)**

OR

For undergraduate level:

A classroom/laboratory activity that uses the example of cocoa production in Africa to help students explore suitable climatic conditions for a crop and to determine how climate change may affect food production.

https://serc.carleton.edu/integrate/teaching_materials/food_security/unit3.html

**3. Suggested
questions/assignments
for learning evaluation**

- Define food security.
- What are the climate-related factors that influence crop yield?
- How might agricultural practices and livestock farming contribute to climate change?
- How could climate change affect global food security?
- Identify actions that could reduce the impact of food production on climate change.

2 Step-by-step User Guide

Here is a step-by-step guide to using this lesson plan in the classroom/laboratory. We have suggested these steps as a possible plan of action. You may customize the lesson plan according to your preferences and requirements.

1. Introduce the topic by playing two micro-lectures (videos)

- Introduce the topic of food security and discuss the relationship between food production and the climate by playing the micro-lecture (video), “Climate Change and Food Security Part 1”, from the course “Our Energy Future” by University of California San Diego.

The micro-lecture is accessible at <https://www.coursera.org/lecture/future-of-energy/climate-change-and-food-security-part-1-5nlWc>.

- Initiate further discussion on the climate-related factors that impact crop yield by playing the micro-lecture (video), “Climate Change and Food Security Part 2”, from the course “Our Energy Future” by University of California San Diego.

The micro-lecture is accessible at <https://www.coursera.org/learn/future-of-energy/lecture/cdxIG/climate-change-and-food-security-part-2>.

2. Conduct the activities in a teaching module (high-school level)

For high-school level:

Next, explore the two-way relationship between agriculture/food production and climate change through activities in the teaching module, “[Our Changing Climate](#)”, developed by the Foodspan initiative of the Johns Hopkins Center for a Livable Future.

- Download the Lesson Plan, Slides, and Handouts from
http://www.foodspanlearning.org/_pdf/lesson-plan/unit2/lesson5-climate-lessonplan.pdf
http://www.foodspanlearning.org/_pdf/lesson-plan/unit2/lesson5-climate-slides.pdf
http://www.foodspanlearning.org/_pdf/lesson-plan/unit2/lesson5-climate-handoutsandguides.pdf

- Conduct the activities described in the Lesson Plan.

OR

OR

**Conduct a
classroom/laboratory
activity (undergraduate
level)**

For undergraduate level:

Next, explore the topic further through a hands-on activity, “[Climate Change and Food Security](#)”, compiled by Russanne Low (Institute for Global Environmental Strategies), Rebecca Boger (Brooklyn College), and Amy E. Potter (Armstrong State University). In this activity, students will learn about the relationship between climate change and food production through the case study of cocoa production in Africa. They will create maps by using the ArcGIS Online tool.

- Go to https://serc.carleton.edu/integrate/teaching_materials/food_security/unit3.html.
- Download the teaching materials available.
- Conduct the activities described in the Study Unit.

3. Questions/Assignments

Use the tools and the concepts learned so far to discuss and determine answers to the following questions:

- *Define food security.*
- *What are the climate-related factors that influence crop yield?*
- *How might agricultural practices and livestock farming contribute to climate change?*
- *How could climate change affect global food security?*

- *Identify actions that could reduce the impact of food production on climate change.*

3 Learning Outcomes

The tools in this lesson plan will enable students to:

- define food security
- identify the climate-related factors that affect food production and crop yield
- discuss how crop production may cause climate change
- discuss how climate change may impact agriculture
- propose actions that may reduce the footprint of the food system on climate change

4 Additional Resources



If you or your students would like to explore the topic further, these additional resources will be useful.

1. Reading

A reading, “Climate Change and Food Security: Risks and Responses”, from the Food and Agricultural Organization (FAO) of the United Nations:

<http://www.fao.org/documents/card/en/c/82129a98-8338-45e5-a2cd-8eda4184550f/>

5 Credits/Copyrights

All the teaching tools in our collated list are owned by the corresponding creators/authors/organizations as listed on their websites. Please view the individual copyright and ownership details for each tool by following the individual links provided.

We have selected and analyzed the tools that align with the overall objective of our project and have provided the corresponding links. We do not claim ownership of or responsibility/liability for any of the listed tools.

1. **Micro-lectures, “Climate Change and Food Security Part 1” and “Climate Change and Food Security Part 2”** Jennifer Burney, [“Our Energy Future”, a course by University of California San Diego](#), hosted on [Coursera](#)
2. **Teaching module, “Our Changing Climate”** [Foodspan initiative of the Johns Hopkins Center for a Livable Future](#)
3. **Classroom/Laboratory activity, “Climate Change and Food Security”** Russanne Low (Institute for Global Environmental Strategies), Rebecca Boger (Brooklyn College), and Amy E. Potter (Armstrong State University); available on [the InTeGrate portal of SERC Carleton](#)
4. **Additional Resources** [Food and Agricultural Organization \(FAO\) of the United Nations](#)