**Lesson Four: Why Don’t We Just Grow More?**

**Overarching Question of the Activity:** Why can’t we just grow more food to feed more people?

**NGSS:** HS-LS1A Structure and Function Within a System, HS-LS2C-Ecosystem Dynamics, Functioning and Resilience, HS-LS2D-Biodiversity and Humans, HS-LS4C Adaptation, HS-LS4D Biodiversity and Humans, HS-ESS2C Roles of Water in Earth’s Surface Processes, HS-ESS2D Weather and Climate, HS-ESS2E Biogeology, HS-ESS3A Natural Resources, HS-ESS3C Human Impacts on Earth’s Systems, HHS-ESS3D Global Climate Change

**CCS:** Reading, Writing

**Goal:**  to have students close read the article The Great Balancing Act and respond to the question, “Why can we not just grow more food to feed a growing population?” This will lead us to look at the Environment node of their class causal loop diagram and begin to investigate the environmental impacts of food security.

**Teacher Information:** So far, in Lesson One, students were introduced to the definition of food security. Lesson Two asked students to start thinking about the different stakeholders involved in the issue of food security. Lesson Three asked students to start thinking about food security as a system, approached through constructing a model of the food security system using the stakeholders as a starting point. Students should be starting to realize their own biases and misconceptions about food security and come to an understanding that this is a very complex problem with no quick, easy fixes. Students should also start to realize that there must be something done, but not at the expense of the environment.

**Assumptions:** In Lesson One, students were asked to respond to a formative assessment question: “The population of the planet is growing very quickly. Is the answer to the growing lack of food security in a growing population simply to grow more food? Justify your answer.” Students will take out their responses and will be using today’s lesson to add to or modify their answer and justifications by exploring the issue of why just growing more is not as pleasant in reality as it is on paper. In Lesson Three, students started to visualize Food Security as a system. They now will see that when things are involved in a system, modifying one node has far reaching consequences for the entire system.

**Introduction:**

Ask students to look at their answers from the question the other day and to discuss at their table what their response was. Have them decide if they are satisfied with it and ask for volunteers to share out their answers.

**Lesson:** Students need to be in pairs for this Close Reading. Students will be given the article The Great Balancing Act to close read and begin formulating a hypothesis around the question of “Why Can’t We Just Grow More?” Teacher will need to chunk the text for the students and assign different groups to different sections of the article. There are three different pillars the article is built around: a) the world needs to close the gap between what food is needed today and what will be needed by 2050, b) the world needs agriculture to contribute to inclusive economic and social development, and c) the world needs to reduce agriculture’s impact on the environment and natural resources. Assign each of the groups one of the lenses to read the article though and have students silently read pgs 1-9 making sure to look at the diagrams. As they are close reading, students need to be underlining with a purpose, looking through their lens, and circling vocabulary words that are important, repeated and defined in the text. Ask students to use the margins of their articles to write a sentence or two summarizing and using power verbs to describe what the author was meaning, and how this relates to the lens they were assigned to look through. Once students have read, have them discuss what they discovered with their reading partner. Ask them to begin to formulate and answer to the question by writing a few rough sentences that begin to explain their viewpoint based on what they read, and reference back to the article with supporting “facts”. We are beginning to draw evidence from an informational text so that we may research, analyze and then reflect on our question.

NOTE TO TEACHER: Towards the end of the article, a “menu” of how to achieve a sustainable food security future is proposed, with potential impacts identified. **These pages are actually meant to line up like a large chart.** Afilled in circle means there is a positive effect, a blank circle is neutral or the effects depend on the situation, and a circle with an X in it is a negative effect. Have students read through the first page of the table. First show students how the chart lines up so that they may read it correctly! This is a highly intense thinking skill/analysis activity!

**Analysis Activity with Chart**: Ask students to a) identify which stakeholder group(s) would be particularly affected, both positively and negatively, by each of the menu actions and how, and b) to look at the dots on the side and decide and state whether they agree with the dots or not. Is this a positive thing for that stakeholder or not? Have them justify their answers through the eyes of the stakeholders. Each student should have their own writing

Example: For the Course Produce more food without land expansion, menu item “boost yield through attentive crop and animal breeding”, all of the dots are not filled in and there is a comment that says that it depends. Who would benefit the most from the “owning” of the seeds? Who would this NOT benefit? Why would that be the case? Do students agree that this action would increase food production and not green house gasses without expense to the environment?

**Wrap Up:** Have students look back at the class systems network of food security and remind them of the cell phone network activity. What happened in the cell phone activity when one of the nodes was removed? What happened to the edges? Were some nodes more important than others and proved to be tipping points? Have students apply that understanding to the nodes on their Food Security Systems Causal Loop Diagram. After today’s lesson, which nodes do they predict will be major nodes, tipping point nodes? Have them justify their reasoning.

**Modification of Activity for time/skill levels:** In the interest of time and/or student skill levels, the teacher may wish to break this chart up into pieces and have each group only take 2 of the statements to identify stakeholders, etc., and then share out those only. It will go faster and will not be so overwhelming for students.

Article: Searchinger, T., et al., The Great Balancing Act Installment 1, World Resource Institute, May 2013, pdf.**wri**.org/**great**\_**balancing**\_**act**.pdf