

Global Food Security

*Course title can be modified to meet instructor's educational context

COURSE RATIONALE:

(This should be defined based on each instructor's individual goals as they fit within the educational context)

COURSE OBJECTIVES:

At the conclusion of this course, the student will be able to understand the major components of global food security. The student will be familiar with the major contributing forces that influence food security, will have an understanding of how each factor influences food security and how they are interconnected.

COURSE TEXTBOOK:

Eise, J., & Foster, K. (2018). *How to Feed the World*. Washington, DC: Island Press.

COURSE REQUIREMENTS:

- (1) For each week, the student will also turn in a reflection of the weeks' reading, which will include a brief summary and synthesis of the most important ideas from the weeks' readings. This will account for 25% of the student's final grade.
- (2) Students will work in teams to identify a problem in food security, devise and defend a solution, identify potential social, technical, economic, and political impediments to implementing their solution, key partners for implementation of the plan, and an implementation plan. A written report and group presentation are due the final week of the term. Written reports will account for 25% of the student's final grade and oral presentations will account for 25% of the student's final grade.
- (3) A final examination over the semester's material will account for 25% of the student's final grade.

COURSE CALENDAR:

(This should be defined based on the instructor's preferred due dates)

SCHEDULED READINGS:

Week 1: Introduction to global food security

Food insecurity arises from a myriad of factors and that also contribute to other global challenges. In 2015, world leaders worked together under the auspices of the United Nations to define 17 Sustainable Development Goals. These goals include aspirations such as "Zero Hunger, Good Health and Well-Being, Clean Water and Sanitation, and Reduced Inequalities" among others. A review of these goals provides a good basis for beginning this course.

Reading Assignment: The Sustainable Development Goals can be reviewed at: <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>.

Learning Objectives: Students will gain appreciation for the challenges for creating a sustainable global society. Students will recognize that these challenges cut across cultures, geography, national boundaries, economic systems, and income attainment. Students will be able to identify key problems/cause that give rise to the symptoms addressed by the Sustainable Development Goals.

Week 2: Population

The population equation is deceptively simple: birth and death. Yet the nuances of population, where it's growing or declining, at what speed, and why, are far more complex. And when it comes to feeding the population, the intricacies skyrocket. Where exactly does the person live and is said individual mobile? Is he or she rich or poor? Young or old? How we confront the uncertainties surrounding future population change underpin the entire food debate.

Reading Assignment: CHAPTER ONE: Inhabitants of earth

Learning Objectives: Students should be able to articulate their personal contributions to population and identify the cultural, experiential, economic, and other contributors to their plans and expectations. Students will develop familiarity with their local, state, and national trends in population and the contributors to those trends. Student will be able to answer the question – “What factors are likely to alter the population trends in your city, state, nation, and the world?” Students will be able to explain the tension between economic development and sustainability it relates to population. Students will demonstrate understanding of the connections between population growth and mobility and food insecurity.

Week 3: Water

The small fraction of water that is actually useable for humans is distributed unevenly across the globe. Yet growing demands for water and over-extraction of ground water with little thought to the future are occurring throughout the world. Fortunately, people are waking up to the reality that water is a precious and limited resource and how we manage water resources has irreversible consequences that are easily foreseen yet dire.

Reading Assignment: CHAPTER TWO: The green, blue and gray water rainbow

Learning Objectives: Students will be able to explain the nature of water within the water rainbow. Students will be able to explain the water cycle and how human activities affect it. Students will be able to identify the key water sources and explain the water quantity and quality challenges of their region, state, and nation. Students will recognize the tension between alternative uses for water and how it relates to food security, sustainability, and economic equality.

Week 4: Land

Land is a finite resource, and arable land is even more precious still. There is no more land to be mined, built or bought once we've occupied it all. How we use this precious resource, and for what purposes, plays a critical role in our ability to sustain our world. Today, there is increasing competition for farmland. Yet it's not just use, but quality degradation as well; water availability, fracking, losses of top soil, damage from salinization and more.

Reading Assignment: CHAPTER THREE: The land that shapes and sustains us

Learning Objectives: Students will be able to identify the major land uses in their local region and state. Students will recognize the tension between alternative uses for land and how it relates to food security, sustainability, and economic equality. Student will be able to explain how land use in their region has changed over time and identify the drivers of these changes.

Week 5: Climate

If temperatures are too hot, plants and animals as well as the workers tending to them suffer greatly. If there is too little rain, or too much, crops will fail. Climate change is here and we now face these challenges every year as the world breaks its previous record for global temperature. The trend of rising heat-trapping, greenhouse gas emissions is not expected to reverse any time soon.

Reading Assignment: CHAPTER four: A changing climate

Learning Objectives: Students will be able to identify key agricultural activities in their local area and how climate has or has not contributed to these industries' success. Students will be able to list important aspects of local area climate and how those enhance and/or detract from food production. Students will be able to explain how their local climate is likely to change in the next three decades. Students should also be able to list and explain adaptations that farmers and/or processors in their local food production have made or will need to make in response to expected climate change.

Week 6: Technology

One of the greatest achievements of humanity in the past half century is building the capacity of the world to feed today's seven billion people. This meteoric rise in agriculture also made food more affordable and accessible, lifting millions out of hunger. Technological innovation drove this rise in agricultural output? But this monumental accomplishment did not come without cost. Technology is what enabled us to feed today's population, and it is also the key to developing more sustainable farming innovations and smarter planting methods. Yet there are signs that agricultural productivity growth is slowing, and it takes time for new ideas to expand from the laboratory to the field.

Reading Assignment: CHAPTER FIVE: The technology ticket

Learning Objectives: Students should know what the Green Revolution was and how it impacted on global food security and sustainability. Students should be able to explain how industry-level productivity is measured and explain both total and partial factor productivity. Students should understand the lengthy dynamics between research investments and realized productivity growth. Students should be able to articulate and defend, with proven or feasible science, their vision for a “Greener Revolution.” Students should be able to explain how technology and population interact in the global food security challenge.

Week 7: Systems

There are lots ways that food can land on your plate. It can be as simple as walking out to your own garden and pulling something off the vine, or as complex as the journey a fresh piece of salmon makes to a landlocked state. Yet it’s not just how it gets to you that can differ, but the way in which it was grown.

Reading Assignment: CHAPTER SIX: Systems

Learning Objectives: Students will be able to explain agricultural systems within a farm to consumer value chain context. Students will demonstrate appreciation for how product and information flows along a value chain in differing agricultural systems. Students will be able to identify and compare at least two agricultural systems that co-exist in their local area. Students will be able to articulate how a variety of agricultural systems may be necessary to increase equality of access to food. Students should be able to explain the role of technology in agricultural systems and food security.

Week 8: Trade

Unlike manufactured products or banking services, agriculture is tied to climate and soils. The only way certain regions can enjoy fresh fruit and vegetables throughout the winter months is to import products from the tropics or the opposite hemisphere. What’s more, international trade is a buffer against unforeseen weather events. Why then is international trade policy so contentious, if it protects us against unexpected weather and gives us what we want to eat when we want to eat it. Opening up to world markets shrinks less competitive sectors and expands those that are more competitive. Yet we don’t have a choice if we want to survive in a world of increased interactivity and climate instability.

Reading Assignment: CHAPTER SEVEN: Tangled trade

Learning Objectives: Students will identify key local food and agricultural products that are exported/traded (could be internationally or across regions of the country). Students will be able to explain the concepts of competitive advantage and comparative advantage and how they relate to trade. Students will demonstrate how climate and climate change impact trade. Students should be able to address the question “How does trade enhance or detract from our ability to adapt to climate change?”

Week 9: Food Waste

Food waste is an unplanned decision made by a well-fed nation of people. Food waste happens at the very end of the chain. We buy more than we need and it goes to waste in our grocery stores, restaurants, cupboards and refrigerators.

Reading Assignment: CHAPTER EIGHT: Spoiled, rotten and left behind

Listening Assignment: <https://islandpress.org/video/feeding-our-world-combating-food-waste-and-unequal-access>

Learning Objectives: Students will demonstrate appreciation for the scale of global food waste and loss. Students will be able to inventory food waste in their own household and identify mechanisms for reducing it. Students will identify key institutional locales in their community where substantial food waste may be occurring and devise options for repurposing it. Students will demonstrate understanding of how resource limits faced by individuals (time, money, knowledge) lead to food waste. Students will be able to compare and contrast the levels and causes of food waste between low- and high-income societies. Students will be able to discuss mechanisms to increase internalization by consumers of the social cost of food waste.

Week 10: No Class (spring break/fall break)

Week 11: Food Loss

Food loss is a devastating force wrought upon populations who usually can't afford to lose their crops. Food loss happens throughout the food chain. It is desperately fought against by farmers around the world. Crops are lost to uncontrolled weeds, bad weather, insect blight, poor storage, forces of nature, poor infrastructure or even unstable political situations.

Reading Assignment: CHAPTER EIGHT: Spoiled, rotten and left behind

Listening Assignment: <https://islandpress.org/video/feeding-our-world-combating-food-waste-and-unequal-access>

Learning Objectives: Students will be able to identify key points of potential food loss in local agricultural systems. Students will be able to explain the role of technology in reducing food loss and identify examples and/or opportunities. Students will be able to compare and contrast the levels and causes of food loss between low- and high-income societies. Students will be able to explain how trade, climate, and water may impact food loss.

Week 12: Health

Nutrition is a critical component of the well-being of our population. It keeps us healthy so we can be productive as well as keeping our healthcare costs low. Yet obesity is on the rise and so are the related health problems that come along with it. Many Americans are confused about how they should eat, and eating is not easy when your dinner is supposed to satisfy your hunger, prevent metabolic syndrome and save your community and possibly the world.

Reading Assignment: CHAPTER NINE: Tipping the scales on health

Learning Objectives: Students will demonstrate understanding of how income growth is shifting health risks. Students will be able to explain the concept of diminishing marginal benefits in the context of diet and nutrition. Students will be able to explain the concept of efficiency in the context of diet and nutritional choices. Students will be able to defend a cost-benefit approach to diet and nutrition. Students will be able to explain the concepts of parsimony and robustness in the context of diet and nutrition and how those related to efficiency.

Week 13: Social License to Operate

We don't all see things the same way. For instance, we have different views of animals and we have different views of species of animals. Different cultures view food production issues differently, and even different *people* view food production issues differently. Using our power to revoke and grant social licenses to operate carries consequences. For instance, failure to understand and appreciate differences in opinion and the nuances of a situation has the potential to not just challenge and disrupt trade relations, but also fuel social discontentment. Interrupted trade and social discontent are serious things indeed when it comes to food security.

Reading Assignment: CHAPTER TEN: Social license to operate

Learning Objectives: Students will be able to define social license in the context of the food and agricultural sector. Students will be able to identify cases in the food industry where social license has been damaged and/or revoked. Students will be able to discuss how the concept of social license might extend to issues related to food waste.

Week 14: Communication

Communication informs our decisions. It informs how we choose to act and how we wield our power as consumers and members of a broader society. And equivalent to its strength and power is its fickleness and imperfection. Ensuring that we have a reliable and trusted flow of information around the challenges we face to feed the world is, in fact, a challenge in itself.

Reading Assignment: CHAPTER ELEVEN: The information hinge

Learning Objectives: Students will be able to explain the demographic changes in agriculture that created increased tensions around communication. Students will be able to list ways in which they can personally improve the ways in which they receive and assess information. Students will be able to discuss examples of communicating well or poorly in food and agriculture.

Week 15: Equal Access

Some people spend their days worried about where their next meal will come from. Still others obsess over posting their perfectly composed social media photos of beautifully plated, delicious food. In this world of obvious contradictions, what factors determine who gets to eat what? When nutritious food is inaccessible or unaffordable, what can be done about it?

Reading Assignment: CHAPTER TWELVE: Achieving equal access

Listening Assignment: <https://islandpress.org/video/feeding-our-world-combating-food-waste-and-unequal-access>

Learning Objectives: Students will assess local access to food within their community and causes of any unequal access. Students will be able to explain that unequal access to food has many dimensions beyond geographical boundaries. Students will be able to compare and contrast the levels and causes of food access inequality between low- and high-income societies. Students will be able to explain the relationship between food waste/loss and unequal food access.

Week 16: Presentations / Exam