Module 6: Agri-Systems Across the City-Rural Gradient
References/Resources

Youtube Video Links:
Lesson B:

1. BluThumb Designs – DIY Hydroponic System
   ➤ Closed Loop Urban Agriculture
   Demonstrates the construction of a low-cost, scalable hydroponic system suitable for urban environments, emphasizing sustainability and accessibility.

Lesson C:

1. Clemson CAFLS – Hydroponic Greenhouse Management
   ➤ Sensors keep roots watered - Gilbert Miller
   Provides an overview of hydroponic greenhouse operations, focusing on system maintenance, nutrient management, and plant health optimization.
2. Eden Green Technology – Inside Look: Drone Tour of Our Cutting-Edge Hydroponic Vertical Farm ➤ Inside Look: Drone Tour of Our Cutting-Edge Hydroponic Vertical Farm
   Offers a comprehensive aerial tour of a state-of-the-art vertical hydroponic farm, showcasing innovative farming techniques and sustainable practices.

General Module References:
These provide overarching frameworks on food systems, circular economy, and urban-rural integration.

1. FAO – Urban Food Systems
   ➤ STRENGTHENING URBAN AND PERI-URBAN FOOD SYSTEMS
   Global overview of food production and logistics across urban–rural zones.
2. Ellen MacArthur Foundation – Cities and Circular Economy for Food
   ➤ Cities and a circular economy for food – overview
   A student-friendly report with graphics on circular design in urban agriculture.
3. ICLEI – Circular Development Pathways in Urban and Rural Contexts
   ➤ Circulars – We are ICLEI Circulars
   Policy and youth-friendly breakdowns of circular approaches across zones.

Lesson A – From Balcony to Back-Forty:
Urban, Peri-Urban, and Rural Systems / Food Miles / Trade-offs

1. USDA – Urban Agriculture Toolkit
   ➤ USDA Urban Agriculture Toolkit: A Brief Overview
   Covers definitions, system comparisons, and startup needs.
2. UN-Habitat – Urban-Rural Linkages: Guiding Principles
   ➤ Urban-rural Linkages: Guiding Principles | UN-Habitat
   Global insight into balancing systems across zones.
3. Project Drawdown – Food, Agriculture, and Land Use
   ➤ Food, Agriculture, and Land Use | Project Drawdown®
   Trade-offs in land use, food miles, and sustainability metrics.

Lesson B – Climate-Smart Growing Spaces:
Circular Techniques by Zone / Water & Waste Reuse / System Design

1. FAO – Climate-Smart Agriculture
   ➤ Climate-Smart Agriculture | Food and Agriculture Organization of the United Nations
   Framework for sustainable practices across all zones.
2. UCANR – Urban Agriculture Resources (California)
   ➤ Urban Agriculture
   Includes composting, rooftop growing, and recycled water examples.
3. World Bank – What is Climate-Smart Agriculture?
   ➤ Climate-Smart Agriculture
   High-level overview plus case studies adaptable for student use.
4. ICLEI – Case Studies: Circular Food and Farming Initiatives
   ➤ Case Studies from Asia: City-Level Learnings for the Global Plastic Pollution Treaty – Circulars
   Real-world examples of resource reuse, including hybrid systems.
5. FAO – What Are Drylands? (Dryland Forestry)
   ➤ What are drylands? | Dryland Forestry | Food and Agriculture Organization of the United Nations
   Explains dryland regions and how forestry supports resilience in fragile ecosystems.

Lesson C – Tech & Metrics That Matter:
Efficiency Metrics / Input–Output Ratios / Sustainability Models

1. NREL – Metrics in Agrivoltaics and Water-Energy-Food Systems
   ➤ Agrivoltaics | Solar Market Research & Analysis | NREL
   How to evaluate systems based on resource use.
2. OpenTEAM – Open Technology Ecosystem for Agricultural Management
   ➤ Open Technology Ecosystem for Agricultural Management
   Tech and sensor-based metrics for evaluating sustainability in farming.
3. Drawdown Labs – Metric Tools for Evaluating Impact
   ➤ Drawdown® Labs | Project Drawdown®
   Interactive tools that allow learners to see environmental trade-offs.
4. FAO – Measuring Sustainable Agriculture
   ➤ Measuring progress towards sustainable agriculture
   Official FAO sustainability indicators for water, energy, and yield.

Optional Add-ons for Student Exploration:
1. Our World in Data – Food & Environment Charts
   ➤ Environmental Impacts of Food Production - Our World in Data
   Clear visuals showing food-related emissions, land use, and water.
2. Google Earth Engine & GIS Tools for Food Systems (Intro)
   ➤ Google Earth Engine
   Advanced: for students curious about satellite-based land use analysis.

Teaching Slide References Links

1. Energy Innovation, 2024
➢ https://energyinnovation.org/expert-voice/building-food-system-resilience-through-urban-agriculture/
2. Fahrer, 2024
➢ https://livingarchitecturemonitor.com/articles/building-rooftop-farms-in-the-san-francisco-bay-area-sp24

3. Saugen, 2017
➢ https://savingplaces.org/stories/californias-century-old-orchards-provide-a-link-to-the-vanishing-past
4. Congress for the New Urbanism
➢ https://www.cnu.org/resources/tools
5. California Department of Food and Agriculture, 2014
➢ https://plantingseedsblog.cdfa.ca.gov/wordpress/?p=7180
6. Big Box Containers
➢ https://www.bigboxcontainers.co.za/blog/shipping-container-farms-an-urban-solution
7. Margaret Zeigler/GHI Article and Image
➢ https://globalagriculturalproductivity.org/case-study-post/china-ramps-up-peri-urban-farming-for-beijing-consumers/
8. FreshFruitPortal, 2023
➢ https://www.freshfruitportal.com/news/2023/01/11/california-rains-bring-wonderful-citrus-a-mixed-blessing/
9. Orchard Machinery Operation Image
➢ https://shakermaker.com/machinery/shockwave-sprint/almond-winter-shake-1/
10. FALK Orchards Image
➢ https://www.falk.com/en-us/projects/new-leaf-orchards
11. Dsouza et al., 2021
➢ https://www.mdpi.com/2071-1050/13/5/2471
12. CB Insights Research, 2021
➢ https://www.cbinsights.com/research/what-is-vertical-farming/
13. Reza et al, 2025
➢ https://www.mdpi.com/1424-8220/25/2/453