



## Module 6: Agri-Systems Across the City-Rural Gradient

### Think Pair Share: Guided Design Jam

Red notes

#### Lesson A

Grouping: 2-3 persons

Time: 25-30 minutes for option (1-3)

#### Materials:

Printed worksheet (this page), Pens or pencils, Scratch paper for drafting, Markers or colored pencils (for sketches), Ruler, and Phone or Laptop (optional)

#### Objective:

Design a food production system that integrates agriculture into an urban context (e.g., balcony, rooftop, school courtyard). This activity challenges you to consider how land use, resource access, food security, and sustainability intersect in cities.

#### Instructions:

1. Work with a partner or small group.
2. Choose ONE focus for your design:
  - a. Mapping Loops
  - b. Water-Use Target
3. Create a rough sketch and description of your system, noting:
  - a. Key components (e.g., hydro tower, raised beds, rooftop greenhouse)
  - b. Inputs (water, energy, labor, waste)
  - c. Outputs (crops, heat, by-products)
  - d. Circular links (how waste becomes an input)
  - e. Efficiency notes (metrics or technology choices)
4. Be ready to share your design with peers in a short (2–3 min) presentation.

#### Your Task:

Use the scaffolded tables below to capture your ideas. Sketches can be drawn on a separate sheet or inserted as photos.



#### Design Table

1. Choose ONE focus (check): <input type="checkbox"/> Mapping Loops <input type="checkbox"/> <b>Water-Use Target</b> t (set target: _____ L/kg)		2. If setting a water target, write it here (e.g., 30 L/kg): (step 2 is optional unless a water-use option chosen.) <b>30/kg</b>		
Key Components: (e.g., Hydro	Inputs: (water, energy, labor, waste)	Outputs: (crops, heat, by-products)	Circular Links: (waste → input loops)	Notes on Efficiency: (metric estimates, tech)

tower, Berry tunnel) Rooftop hydroponic tower, rainwater collection barrels, solar pump.	Rainwater + greywater reuse, solar power for pumps, moderate labor, kitchen waste compost as nutrients.	Leafy greens, herbs, small fruits; reduced heat island effect; by-products = greywater, compost.	Food scraps → compost → hydroponic nutrients; rainwater → storage tank → irrigation loop.	Water efficiency high (closed-loop ~25–30 L/kg), energy renewable, land cost high but footprint small.
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3. Quick Reflection: What is the most significant sustainability advantage of your design in this zone?

Urban design maximizes space efficiency and reduces food miles, but production scale is limited.

### Reflection

Select 3 of these questions to explore with your group:

1. How does the concept of circularity help in building more efficient urban agri-systems?
2. What technologies or strategies would provide the greatest sustainability boost in a city?
3. Which inputs were most challenging to balance in your urban design?
4. If you could only improve one resource flow (water, energy, nutrients), which would it be and why?

Question 1:  
Q1

Key Insights from Group Discussion:

Circularity ensures that waste is not wasted. In urban systems with limited space and resources, turning food scraps into compost, reusing graywater for irrigation, or capturing rooftop runoff closes loops. This reduces input costs, cuts pollution, and makes the farm more resilient by keeping resources cycling locally instead of relying on constant outside supply.

<p>Question 2: Q2</p>	<p>Key Insights from Group Discussion: Water-smart technologies like drip irrigation, hydroponics, and rainwater harvesting offer the biggest gains in cities where water is limited and expensive. Paired with vertical farming or rooftop greenhouses, these systems maximize yield per square meter while minimizing transport and water use. Composting and energy recovery from waste also help cut costs and emissions.</p>
<p>Question 3: Q3</p>	<p>Key Insights from Group Discussion: Water and energy were the hardest to balance together. High-tech systems like hydroponics and LED grow lights save water but require more electricity. Meanwhile, low-tech systems may use less energy but waste more water. The trade-off between conserving one resource while consuming more of another was the biggest design challenge.</p>
<p>Question 4: Q4</p>	<p>Key Insights from Group Discussion: Improving water use would have the greatest impact. In urban areas, water is often the most constrained and costly resource, and inefficient irrigation directly limits yield. By focusing on water efficiency—through drip systems, hydroponics, or rain capture—you also improve nutrient cycling and energy use indirectly, since less pumping and treatment is needed.</p>

**Skills You'll Use:**

- Systems thinking
- Problem-solving and creative design
- Understanding of feedback loops and circular economy principles
- Communication and collaboration