

### Visible Elements in Photo



- Agricultural field (green crops in organized rows)
- Morning mist or fog hovering over the field and distant treeline
- Utility poles and transmission lines visible through the mist
- Body of water (river or irrigation channel) in the foreground with banks and vegetation
- Flat to gently rolling terrain with clear horizon line

### Reasonable Inferences

- From mist and early light: Early morning conditions create moisture in the air, suggesting temperature changes and water evaporation/condensation cycles that affect farming.
- From organized crop rows and utility infrastructure: This is an active agricultural operation requiring water management, irrigation, and power delivery to support large-scale food production.
- From water body and flat terrain: The landscape is prone to flooding or water accumulation during heavy rain, which could damage crops or infrastructure.

### Engineering Task

#### K-2 Challenge:

Your job is to design a small water channel or path that helps water move safely across a pretend farm without washing away the plants. Use clay, sand, sticks, and string to show how water could flow from a "river" through a "field" without making a big mess. Test it by pouring a small cup of water and watching where it goes!

#### 3-5 Challenge:

Your challenge: Create a model system that protects a crop field from flooding during heavy rain while still providing irrigation water when needed. Your design must:

- Prevent water from pooling directly in the crop rows (crops can rot if waterlogged)
- Direct excess water safely away from the field using channels, levees, or barriers
- Allow water to be stored or distributed to plants during dry periods
- Be built using only paper, clay, sand, and water, within a 12" x 18" model space
- Successfully handle at least 2 cups of water poured over 10 seconds without washing away your "crops" (small beans or pebbles placed in rows)

Test and refine your design based on what you observe. Sketch your final solution and explain why it works.

### EDP Phase Targeted

Ask / Define Problem — This phase fits best because the photo shows a real-world agricultural landscape where water management is a critical, ongoing challenge. Students must first understand why water control matters (crop health, flood prevention, irrigation efficiency) before designing solutions. The misty conditions and visible water body naturally prompt inquiry: "How do farmers keep water where it helps and away from where it hurts?"

### Suggested Materials

- Clay or modeling compound
- Sand and soil
- Paper or plastic cups (for water testing)
- Sticks, straws, or small dowels (for channels and levees)
- String or yarn (to mark field boundaries)
- Small beans, pebbles, or dried corn kernels (to represent crops)
- Measuring cups (for consistent water amounts)
- Shallow plastic trays or cardboard boxes (as model bases)

### Estimated Time

- K-2: 30–40 minutes (including water test and observation)
- 3-5: 50–70 minutes across two sessions (design day 1; build and test day 2)

### Why This Works for Teachers

This task directly addresses NGSS ETS1.B: Developing Possible Solutions by requiring students to design and test alternative approaches to a real environmental problem—water management in agriculture—reinforcing how engineering improves human life and environmental stewardship.