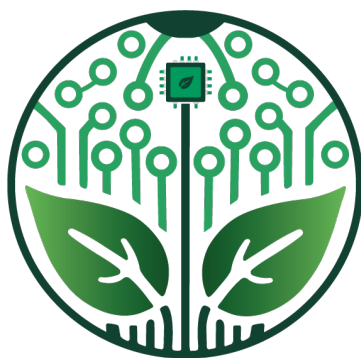




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LESSON PLAN

AI in Sustainable Agriculture: Precision for People and Planet

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Disclaimer



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1. TITLE

AI in Sustainable Agriculture: Precision for People and Planet

2. GRADE LEVEL

- ISCED Level 3 – Upper Secondary Education (ages 15–18)

3. SUBJECT AREA

- Sciences
- Environmental Studies
- Geography

4. TYPE

- Lesson Plan

5. DURATION

- 2 x 40-minute classes

6. LEARNING OBJECTIVES

- O1- Explain how precision agriculture can reduce water, fertilizer and pesticide use.
- O2- Interpret simple examples of satellite/field data and identify where resources are being wasted.
- O3- Design an AI-supported farming plan for irrigation or fertilization that improves sustainability.
- O4- Discuss ethical issues such as data ownership, farmer access and biodiversity impacts.



7. Key Competences Developed

- Literacy
- Mathematical competence and competence in STEM
- Digital competence
- Personal, social and learning to learn competence
- Citizenship competence

8. Prior Knowledge / Prerequisites

Basic understanding of agriculture and ecosystems; basic digital skills.

9. Lesson/Project Outline

Phase 1 – Introduction (Engage & Contextualize)

Teacher introduces the idea of precision agriculture and its link to sustainability.

Activities:

Brainstorm: What inputs do farmers control (water, fertilizer, pesticides, fuel)?

Short video on precision farming and sensors/drones/satellites.

Class discussion:

How could AI decide ‘where and when’ to use resources?

What could go wrong (cost, bias, data privacy)?

Outputs: shared list of potential benefits and concerns.

Resource (name)	Link (to the folder on Teams)
Precision agriculture explained (video) https://www.youtube.com/watch?v=WhAfZhFxHTs	



Phase 2 – Exploration (Investigate & Compare)

Students explore how data can guide sustainable decisions on a farm.

Activities:

Teacher provides example maps (soil moisture, NDVI/vegetation, yield map) or an online demo.

In pairs, students answer:

Where is the field stressed? Where might irrigation be unnecessary?

What data would an AI model need to recommend actions?

Compare two scenarios: ‘uniform input’ vs ‘variable-rate input’.

Outputs: annotated map notes and a short explanation of how data supports sustainability.

Resource (name)	Link (to the folder on Teams)

Phase 3 – Application (Hands-On Practice)

Groups create an AI-supported plan for a sustainable farm scenario.

Activities:

Choose one goal: reduce water use, reduce fertilizer runoff, or improve biodiversity strips.

Design rules for an AI assistant (thresholds, priorities, alerts) and explain the data inputs.

Estimate expected benefits (less water, lower emissions, cleaner rivers) and identify potential risks.

Create a poster/slide with a simple workflow diagram (data → AI → action → impact).

Outputs: group farming plan, workflow diagram, sustainability justification.

Resource (name)	Link (to the folder on Teams)

Phase 4 – Reflection & Consolidation (Present & Connect)

Groups present and reflect on responsible innovation in food systems.

Reflection questions:

Who gains the most from AI in agriculture and who could be left out?

How can we protect farmer data while still improving sustainability?

How should technology support, not replace, ecological knowledge?

Outputs: presentations and short written reflections.

Resource (name)	Link (to the folder on Teams)



10. Assessment Criteria

Participation and quality of data interpretation activity.
Clarity and feasibility of the AI-supported farming plan.
Explicit link between actions and sustainability outcomes.
Reflection on ethics, access and biodiversity.

Resource (name)	Link (to the folder on Teams)

11. Teaching Materials

Name	Type (Developed/Existing)	Link	Role in the lesson
Precision agriculture explained	Existing video	https://www.youtube.com/watch?v=VwJmB3r9zj0	Phase 1

12. External Resources and References

Resource (name)	Link (external or to the folder on Teams)
FAO – Digital agriculture (overview)	https://www.fao.org/digital-agriculture/en/
NASA Earthdata (satellite data)	https://earthdata.nasa.gov/