Exercise walk-through

5.1 Land, food and resource decisions

International Baccalaureate · IB Diploma · Environmental Systems and Societies ·

INTERNATIONAL BACCALAUREATE · IB DIPLOMA · ENVIRONMENTAL SYSTEMS AND SOCIETIES · HL • EXERCISE SHEET

5.1 Land, food and resource decisions

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS erosion • resource

Objective

Land, food and resource decisions. Original classroom practice for IB HL; not an official IB paper.

1 Key knowledge and worked examples

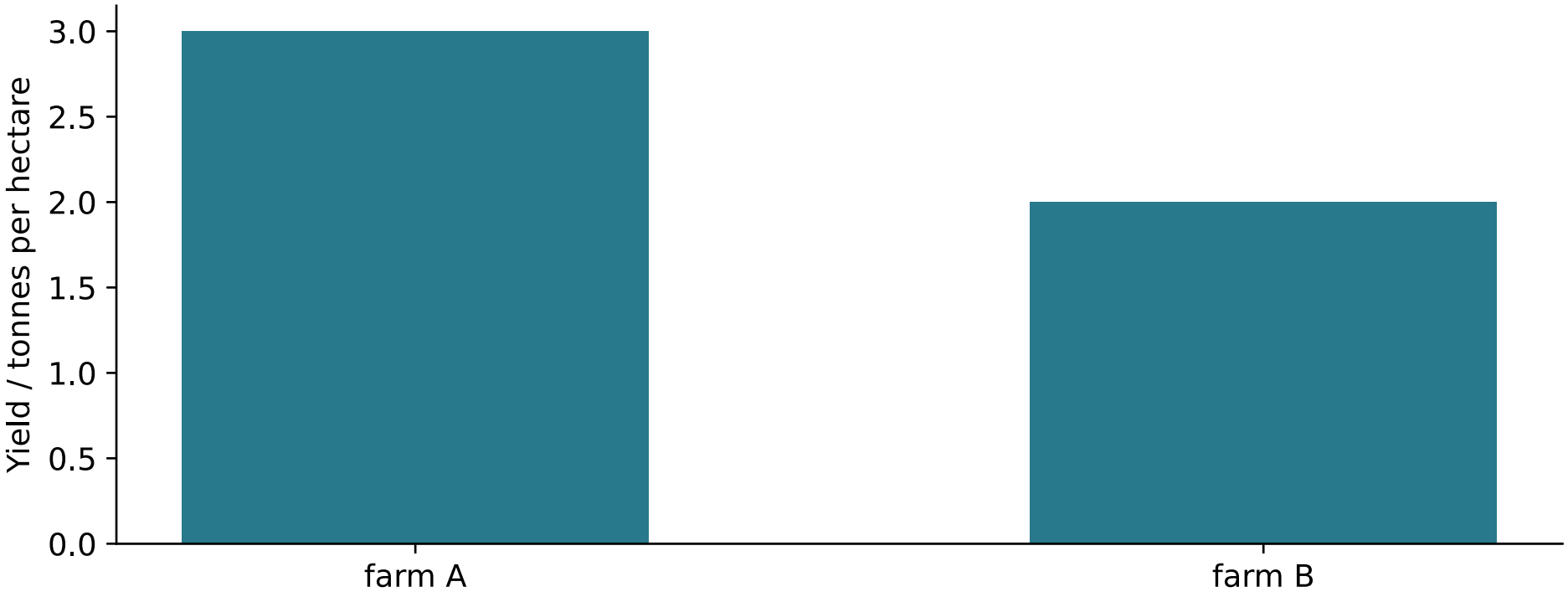
What would explain this observation?

- A farm can increase yield while increasing soil loss or water demand. Food-system evaluation requires more than tonnes harvested.

Build the model

- Soil supports nutrient cycling, water storage and organisms.
- **Erosion** removes soil; nutrient depletion changes fertility.
- **Resource** use involves extraction, production, distribution and waste.

- erosion: Removal and transport of soil or rock.
- resource: A material or service used to meet needs.



Choose evidence that can test it

- Distinguish total yield from yield per area and energy input.
- Sustainable management must consider regeneration rates and impacts beyond the farm boundary.
- Different stakeholders may rank food security, biodiversity and income differently.

In the lab: Compare management options using a stated functional unit and the same timescale. Use approved secondary datasets or non-destructive soil observations. Explain trade-offs instead of claiming a method has no disadvantages.

Work from known quantities

- Known: farm A harvests 18 tonnes from 6 hectares.

- Yield per area = 18/6 = 3 tonnes per hectare.
- Farm B harvests 20 tonnes from 10 hectares, so its yield is 2 tonnes per hectare despite a larger total harvest.

Your turn: A farm harvests 28 tonnes from 7 hectares. Find yield per hectare.

■ Check the conclusion and its limits

- A high yield is not proof of long-term soil health.
- Renewable resources can be depleted when use exceeds regeneration.

Not true: A renewable resource cannot be depleted. Renewable means the resource can regenerate, not that it regenerates faster than every possible rate of use. Fish stocks and soils are renewable yet have been depleted when harvest exceeded renewal.

Key:

- Soil supports nutrient cycling, water storage and organisms.
- Distinguish total yield from yield per area and energy input.
- Watch for: A high yield is not proof of long-term soil health.

■ Write from a yield of 5 tonnes per hectare

- A farm harvests 40 tonnes from 8 hectares.
- Find the yield per hectare. A renewable resource can still be depleted.

Exercises 2.1·2.3

2.1 Which comparison measures land productivity? Choose one answer.

- **A** Only fertilizer price
- **B** Harvest divided by cultivated area
- **C** Total harvest without land area [1]

2.2 A farm harvests 28 tonnes from 7 hectares. Find yield per hectare. Show the relation, substitution and units. [2]

2.3 Decide whether this claim is true and justify: Renewable means the resource can regenerate, not that it regenerates faster than every possible rate of use. [2]

Exercises 2.1·2.3

2.1 Which comparison measures land productivity? Choose one answer.

- **A** Only fertilizer price
- **B** Harvest divided by cultivated area
- **C** Total harvest without land area [1]

2.1 B Productivity is output per unit of input, here harvest per hectare. A large total harvest can hide poor land productivity, and a price says nothing about how much the land produced.

2.2 A farm harvests 28 tonnes from 7 hectares. Find yield per hectare. Show the relation, substitution and units. [2]

2.2 yield per area=28/7=4t/ha.

2.3 Decide whether this claim is true and justify: Renewable means the resource can regenerate, not that it regenerates faster than every possible rate of use. [2]

2.3 True. True. Renewable means the resource can regenerate, not that it regenerates faster than every possible rate of use. Fish stocks and soils are renewable yet have been depleted when harvest exceeded renewal.

Exercises 2.4·3.1

2.4 Removal and transport of soil or rock: write the technical term. [1]

3.1 Fictional farms produce 24 t on 6 ha and 30 t on 10 ha. Compare yield and total output. Can sustainability be inferred? [4]

Exercises 2.4·3.1

2.4 Removal and transport of soil or rock: write the technical term. [1]

2.4 erosion. erosion means Removal and transport of soil or rock.

3.1 Fictional farms produce 24 t on 6 ha and 30 t on 10 ha. Compare yield and total output. Can sustainability be inferred? [4]

3.1 Yields 4 and 3 t/ha; second total is larger. Inputs, soil, water, biodiversity and timescale are missing. Yield is only one criterion.