AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

5.15 Sustainable Agriculture

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

Objective

Build the skills to answer exam questions on **sustainable agriculture**.

You must be able to:

- describe **crop rotation** 轮作, **cover crops** 覆盖作物, **no-till** 免耕, and **contour plowing** 等高耕作
- explain how each conserves soil and nutrients
- link practices to reduced erosion and inputs

1 Worked examples

Study these first. Each one shows the method for a question type used later —follow the steps and you can do the Practice and Exam-style questions yourself.

Sustainable practices

- **Crop rotation** —changing crops each season; restores nutrients (especially with legumes) and breaks pest cycles.
- **Cover crops** —plants grown to protect and enrich soil between harvests.
- **No-till** —planting without plowing; keeps roots holding the soil.
- **Contour plowing / terracing** —plowing across slopes to slow runoff and erosion.

How they conserve soil

They keep soil **covered** and **held by roots**, reducing erosion, and they **restore nutrients** naturally, cutting the need for fertilizer.

A worked link

Planting a legume cover crop over winter fixes nitrogen and protects the soil from erosion, so less fertilizer is needed the next season.

2 Practice

Now apply the methods above.

2.1 How does crop rotation restore soil nutrients? [1]

2.2 How does no-till farming reduce erosion? [1]

2.3 What is contour plowing for? [1]

3 Exam-style questions

3.1 Planting a legume in a rotation helps because it [1]

- **A** removes nitrogen
- **B** adds (fixes) nitrogen to the soil
- **C** increases erosion
- **D** needs no water

3.2 A farmer adopts cover crops and no-till.

(a) Explain how each reduces soil erosion. [2]

(b) State one other benefit of cover crops. [1]

3.3 Explain how contour plowing on a slope reduces erosion. [2]

4 Go further

You are now ready for the real exam questions on this subtopic:

- work through the **5.15 Sustainable Agriculture** lesson on the **Learn** page;
- read the **Sustainable Agriculture** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 Rotating crops (especially legumes) replenishes nutrients like nitrogen.

2.2 It avoids plowing, so roots keep holding the soil in place.

2.3 To slow runoff and reduce erosion on slopes.

3.1 B —adds (fixes) nitrogen to the soil.

3.2 (a) Cover crops keep the soil covered and held by roots; no-till avoids exposing loose soil, so both reduce erosion. (b) Cover crops add organic matter/nutrients and suppress weeds.

3.3 Plowing across (along) the slope creates ridges that slow water flowing downhill, giving it time to soak in rather than washing soil away.