

Exercise walk-through

Sustainable Agriculture ■ 5.15

eXercise

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

Method — 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.

Method — How they conserve soil

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

Method — 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.

Practice 2.1 ■ 1 mark

How does crop rotation restore soil nutrients?

Solution 2.1

Method: Sustainable practices

Worked steps

Rotating crops (especially legumes) replenishes nutrients like nitrogen **B1**.

Practice 2.2 ■ 1 mark

How does no-till farming reduce erosion?

Solution 2.2

Method: Sustainable practices

Worked steps

It avoids plowing, so roots keep holding the soil in place **B1**.

Practice 2.3 ■ 1 mark

What is contour plowing for?

Solution 2.3

Method: Sustainable practices

Worked steps

To slow runoff and reduce erosion on slopes **B1**.

Exam-style 3.1 ■ 1 mark

Planting a legume in a rotation helps because it

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

Solution 3.1

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

Worked steps

B — adds (fixes) nitrogen to the soil.

Exam-style 3.2 ■ 2 marks

A farmer adopts cover crops and no-till.

- (a) Explain how each reduces soil erosion.
- (b) State one other benefit of cover crops.

Solution 3.2

Method: Sustainable practices

Worked steps

(a) Cover crops keep the soil covered and held by roots; no-till avoids exposing loose soil, so both reduce erosion **M1** **A1**. (b) Cover crops add organic matter/nutrients and suppress weeds **B1**.

Exam-style 3.3 ■ 2 marks

Explain how contour plowing on a slope reduces erosion.

Solution 3.3

Method: Sustainable practices

Worked steps

Plowing across (along) the slope creates ridges that slow water flowing downhill, giving it time to soak in rather than washing soil away **M1** **A1**.