

Exercise walk-through

Irrigation Methods ■ 5.5

eXercise

You must be able to

- compare **flood/furrow**, **spray**, and **drip** 滴灌 irrigation for efficiency
- explain **waterlogging** 涝渍 and **salinization** 盐碱化
- link method to water loss

Method — Irrigation methods

- **Flood/furrow** — floods the field; cheap but wasteful (much evaporation and runoff).
- **Spray (sprinkler)** — sprays water; moderate efficiency, some evaporation loss.
- **Drip** — delivers water slowly to roots; **most efficient**, least evaporation, but costly to install.

Method — Waterlogging

Over-watering can saturate soil (**waterlogging**), starving roots of oxygen.

Method — Salinization

As irrigation water evaporates, it leaves **salts** behind. Over time salts build up in the soil (**salinization**), reducing fertility — a major problem in dry regions.

Method — A worked comparison

Drip irrigation delivers water straight to the roots with little evaporation, so it uses far less water than flooding a field.

Practice 2.1 ■ 1 mark

Which irrigation method is the most water-efficient?

Solution 2.1

Method: Irrigation methods

Worked steps

Drip irrigation **B1**.

Practice 2.2 ■ 1 mark

What is salinization?

Solution 2.2

Worked steps

Build-up of salts in the soil as irrigation water evaporates **B1**.

Practice 2.3 ■ 1 mark

What causes waterlogging?

Solution 2.3

Worked steps

Over-watering that saturates the soil **B1**.

Exam-style 3.1 ■ 1 mark

The most water-efficient irrigation method is

- A** flood irrigation
- B** furrow irrigation
- C** drip irrigation
- D** spray irrigation

Solution 3.1

Method: Irrigation methods

A flood irrigation

B furrow irrigation

C drip irrigation



D spray irrigation

Worked steps

C — drip irrigation.

Exam-style 3.2 ■ 2 marks

A dry-region farm uses flood irrigation for years.

- (a) Explain how this leads to salinization.
- (b) Suggest a more efficient method and why.

Solution 3.2

Method: Irrigation methods

Worked steps

(a) The water evaporates and leaves dissolved salts in the soil; repeated over years, salts build up and reduce fertility **M1 A1**. (b) Drip irrigation — it delivers water to the roots with little evaporation, so less salt is left behind and less water is used **M1 A1**.

Exam-style 3.3 ■ 2 marks

Explain why waterlogging harms crops.

Solution 3.3

Worked steps

Waterlogged soil has no air spaces, so roots cannot get oxygen and the plant suffocates/dies **M1** **A1**.