AP ENVIRONMENTAL SCIENCE • EXERCISE SHEET

5.5 Irrigation Methods

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

Objective

Build the skills to answer exam questions on **irrigation methods**.

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

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.

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.

Waterlogging

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

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.

A worked comparison

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

2 Practice

Now apply the methods above.

2.1 Which irrigation method is the most water-efficient? [1]

2.2 What is salinization? [1]

2.3 What causes waterlogging? [1]

3 Exam-style questions

3.1 The most water-efficient irrigation method is [1]

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

3.2 A dry-region farm uses flood irrigation for years.

(a) Explain how this leads to salinization. [2]

(b) Suggest a more efficient method and why. [2]

3.3 Explain why waterlogging harms crops. [2]

4 Go further

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

- work through the **5.5 Irrigation Methods** lesson on the **Learn** page;
- read the **Irrigation Methods** section of the AP Environmental Science handout on the **Know** page.

Solutions

2.1 Drip irrigation.

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

2.3 Over-watering that saturates the soil.

3.1 C —drip irrigation.

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

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