

Exercise walk-through

5.16

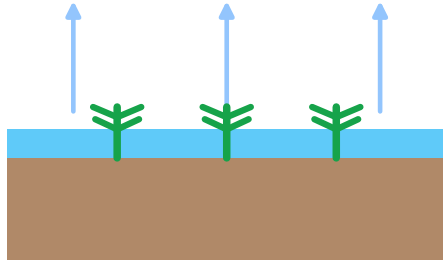
Aquaculture

AP Environmental Science

Irrigation methods, and what each costs

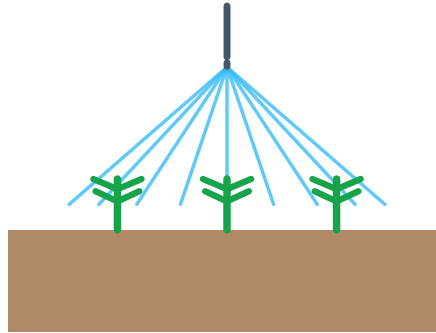
Flood / furrow

much evaporates
& runs off



water efficiency
~50%

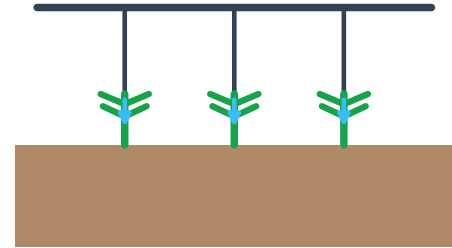
Spray / sprinkler



water efficiency
~70%

Drip

water to the roots



water efficiency
~90%

AP Environmental Science · U5 · three irrigation methods, from low to high water efficiency

Flood irrigation is cheap and wasteful; drip delivers water to the root and wastes least. The trade-off is always **cost against water lost**.

Overfishing and aquaculture

Overfishing removes fish faster than they reproduce, collapsing populations – cod is the standing example. **Bycatch** and bottom trawling damage the ecosystem as well as the target stock.

The open ocean is the classic **tragedy of the commons**: no one owns the fish.

Aquaculture eases pressure on wild stocks and is efficient, but it can:

- pollute water with waste and antibiotics;
- spread disease to wild fish;
- destroy habitat – mangroves cleared for shrimp farms.

Check yourself

- 1 In the commons, who gets the gain and who pays the cost?
- 2 Which irrigation method wastes the least water?
- 3 What does IPM do before spraying pesticide?
- 4 Name the three pillars of sustainability.



Answers 1. gain to one user, cost shared by all 2. drip 3. monitor pest numbers
4. economic, social, environmental

Exercises 2.1-2.3

2.1 What is aquaculture?

[1]

2.2 State one benefit of aquaculture.

[1]

2.3 State one environmental impact of aquaculture.

[1]

Exercises 2.1-2.3

2.1 What is aquaculture?

[1]

2.1

- Farming aquatic organisms (fish, shellfish)

2.2 State one benefit of aquaculture.

[1]

2.2

- Any one: relieves overfishing, high protein yield

2.3 State one environmental impact of aquaculture.

[1]

2.3

- Any one: waste pollution, disease spread, escapees, habitat loss

Exercise 3.1

3.1 One environmental problem with fish farming is

[1]

☐

A it eliminates all pollution

B waste and disease can affect nearby waters

C it increases wild fish stocks directly

D it uses no feed

Exercise 3.1

3.1 One environmental problem with fish farming is

[1]

☐

A it eliminates all pollution

B waste and disease can affect nearby waters

C it increases wild fish stocks directly

D it uses no feed

3.1 B

- waste and disease can affect nearby waters

Exercise 3.2 (a)

3.2 A coastal region builds fish farms.

(a) Explain one benefit and one drawback.

[2]

Exercise 3.2 (a)

3.2 A coastal region builds fish farms.

(a) Explain one benefit and one drawback.

[2]

(a)

- Benefit: relieves pressure on wild stocks / efficient protein; drawback: waste pollution, disease, or habitat loss

Exercise 3.2 (b)

3.2 A coastal region builds fish farms.

(b) Explain how escaped farmed fish could harm wild populations.

[2]

Exercise 3.2 (b)

3.2 A coastal region builds fish farms.

(b) Explain how escaped farmed fish could harm wild populations.

[2]

(b)

- Escapees can spread disease, compete with, or interbreed with wild fish, weakening wild populations

Exercise 3.3

3.3 Explain why crowding in fish pens increases disease risk.

[2]

Exercise 3.3

3.3 Explain why crowding in fish pens increases disease risk.

[2]

3.3

- Crowding lets pathogens and parasites spread quickly between the closely packed fish, so disease outbreaks are more likely