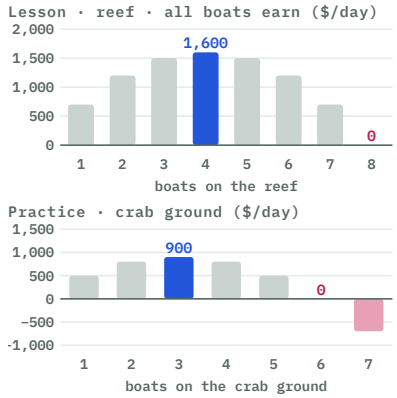
Who owns the fish?

Open access = a resource nobody owns and anyone may use: no permission, no price, no limit (the reef, the open sea, a free road at rush hour). Users come until the last one earns nothing → the resource earns nobody anything. Cause: **the missing price**. Three fixes put a price or an owner back, each with a cost; the lesson picks none.

1 The reef

n boats

- Recall **Games 6**: open lake → 10 boats, $0 · best 5 boats, $250 = **tragedy of the commons**
- **Your guess** (never graded or saved): of 100 fish stocks, how many fished faster than they grow back? → **FAO** (UN Food and Agriculture Organization), 2026: **38** in 2023 · 10 in 1974
- Toy (made-up) numbers: n boats → each catches `12 − n` crates · crate **$100** · boat **$400** a day ⇒ each earns `800 − 100n`
- Open access: a boat comes while it earns something → 8 boats: 4 crates = $400 = cost → each **$0** · a 9th −$100 ⇒ **8 boats, reef $0** = **open-access equilibrium**
- Island's best: tallest bar → **4 boats, $1,600 a day** (`4 × 400`) · 5 boats $1,500
- Practice · crab ground `10 − n` crates: best **3 boats, $900** · open access **6 boats, $0** · a 7th −$100



2 The missing price

what nobody pays

- 5th boat: 7 crates − $400 = **+$300** for itself · each of the other 4 catches 1 crate less: `4 × 1 × $100` = **−$400** · island **−$100** (1,600 → 1,500)
- Counts its $300, never the $400: nobody can send the bill ⇒ **what nobody owns, nobody charges for** (= Lesson 1's mill) · textbook name: **stock externality**
- Practice: 4th crab boat **+$200** · the other 3 `3 × $100` = **−$300** · ground **−$100** (900 → 800)

3 Fix 1 · Fix 2

an owner · the users' rules

- ① **An owner**: council leases the reef to one company → it counts every boat's catch: 5th boat +$300 vs −$400 on its own boats → stops at **4 boats, $1,600** · **Ronald Coase** (British economist, 1960; Micro 2 Lesson 10): clear owner → efficient amount · for: no inspector · cost: the $1,600 is one company's
- ② **Rules from the users**: **Elinor Ostrom**, American political scientist (1933-2012), *Governing the Commons* 1990, Nobel **2009** (first woman) · Swiss pastures, Spanish canals, Maine lobster grounds → lasted centuries · clear boundaries · users write the rules · watch each other, penalties grow · cheap ways to settle quarrels · cost: best when users are **few, close, there to stay**
- Practice · two crews, one cove: many traps **dominant** (best whatever the other does: 8 > 6, 4 > 3) → **4 / 4**, though 6 / 6 is better for both · crews who see each other's traps can hold 6 / 6

PRACTICE · TALA AND KOFI · $100S A DAY

	Kofi few	Kofi many
Tala few	6 / 6	3 / 8
Tala many	8 / 3	4 / 4

4 Fix 3 · quotas

that trade

- Cap: **4 licenses** (the right to run 1 boat), sellable · **ITQ** = individual transferable quota: a share of a capped catch that can be sold
- License = what a boat with it earns = **$400 a day** · × 4 = the island's $1,600 · storm, 1 crate less → **$300** ⇒ holders gain when the reef recovers
- Who gets them? **given to old crews**: fair, quick · but public fish free, newcomers buy in | **auctioned**: island collects · but old crews pay, a big buyer may take all · no verdict
- Practice · 3 licenses: `7 × 100 − 400` = **$300** each · auction `3 × 300` = **$900** a day · good season +2 crates: `9 × 100 − 400` = **$500**
- Real: **Iceland** 1984/1990 · **New Zealand** 1986 · Costello et al., *Science* 2008 (11,000+ fisheries): ITQs ≈ **half as likely to collapse** (catch < ⅒ of record)

5 Who owns it?

three kinds

- **Open access** (nobody owns, anyone uses): open sea, free parking, wild mushrooms · **managed commons** (users keep outsiders out, bind each other to rules): village canal, lobster ground, village well · **private** (one owner, can exclude): fish farm, orchard, hotel beach
- **Garrett Hardin**, American ecologist, "The Tragedy of the Commons", *Science* 1968: his pasture was open to all ⇒ the tragedy is of **open access**, not of sharing · difference = can anyone say no?
- Chain: nobody owns it → no boat pays for what it takes → a boat comes while it earns → each catches less → until each earns $0 · university: **bioeconomic models** (the stock grows and shrinks)
- **Ten questions to ask about any green policy** (so far): **1** · What does the smoke really cost, and who pays that cost now? · **2** · Who owns the resource? What nobody owns, everybody overuses.

Watch out: open access ≠ managed commons (classic exam mistake) · the island's best (4 boats) ≠ where boats stop (8) · not every commons is doomed: Ostrom's lasted centuries · no bad people needed: each boat answers a price of zero · a license is worth what a boat earns with it