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Challenges of Overfishing and Destructive Fishing Practices

Module 2: Fisheries and Aquaculture Sustainability

Duration: 1 Hour

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Content

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Overfishing

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overfishing is defined as a situation where fish stocks are exploited beyond biologically sustainable levels, meaning they are harvested faster than they can reproduce and replenish(FAO, 2022).

- Human fishing has historically led to serial depletion of species and ecosystem disruption. Industrialization (steam trawlers, diesel engines, sonar) made exploitation more efficient, accelerating overfishing (Pauly et al., 2002, p. 689–690)
- Destructive practices such as bottom trawling and IUU fishing still contribute significantly to biodiversity loss and undermine food security (FAO, 2022, p. 126–129).

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Global trends in the state of the world's marine fisheries stocks, 1974–2019

- In 2020, 35.4% of assessed fish stocks were overfished (unsustainable), compared to only 10% in 1974. This shows a worsening trend despite management attempts (FAO, 2022, p. 47–48)

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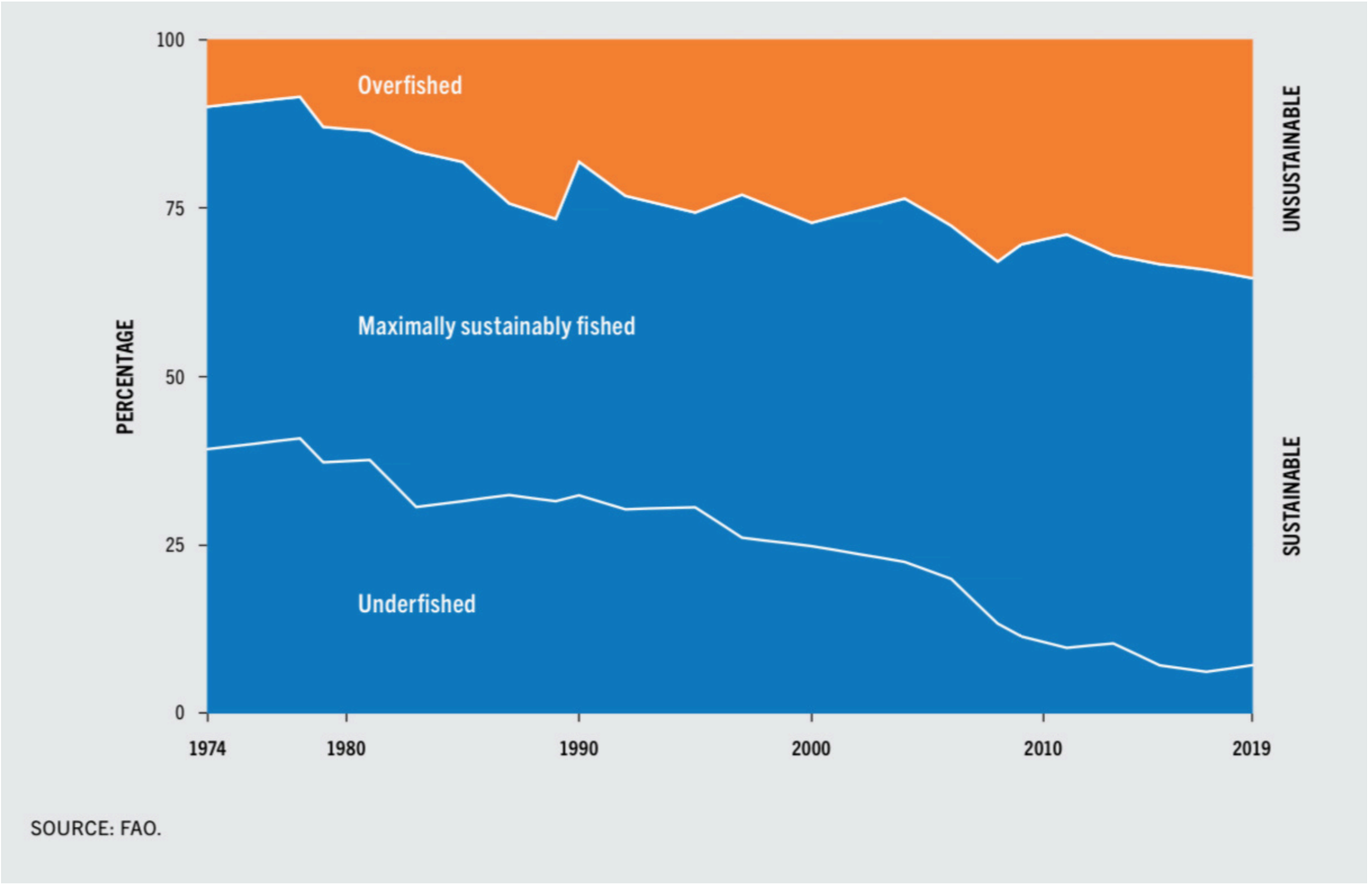

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Drivers of Overfishing

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1 Open-access fisheries and weak regulation

- Many fisheries operate as open access (anyone can fish), which leads to over-exploitation.
- FAO stresses that weak governance and limited management capacity are key factors driving overfishing, especially in developing countries.

2 Economic demand and technological advances

- High demand for fish (global consumption doubled since the 1960s) drives exploitation (FAO, 2022, p. xvi, 81).
- Pauly et al. (2002) explain that technological innovations (steam trawlers, sonar, radar, freezer trawlers) greatly increased catch efficiency, making fishing mortality control harder.

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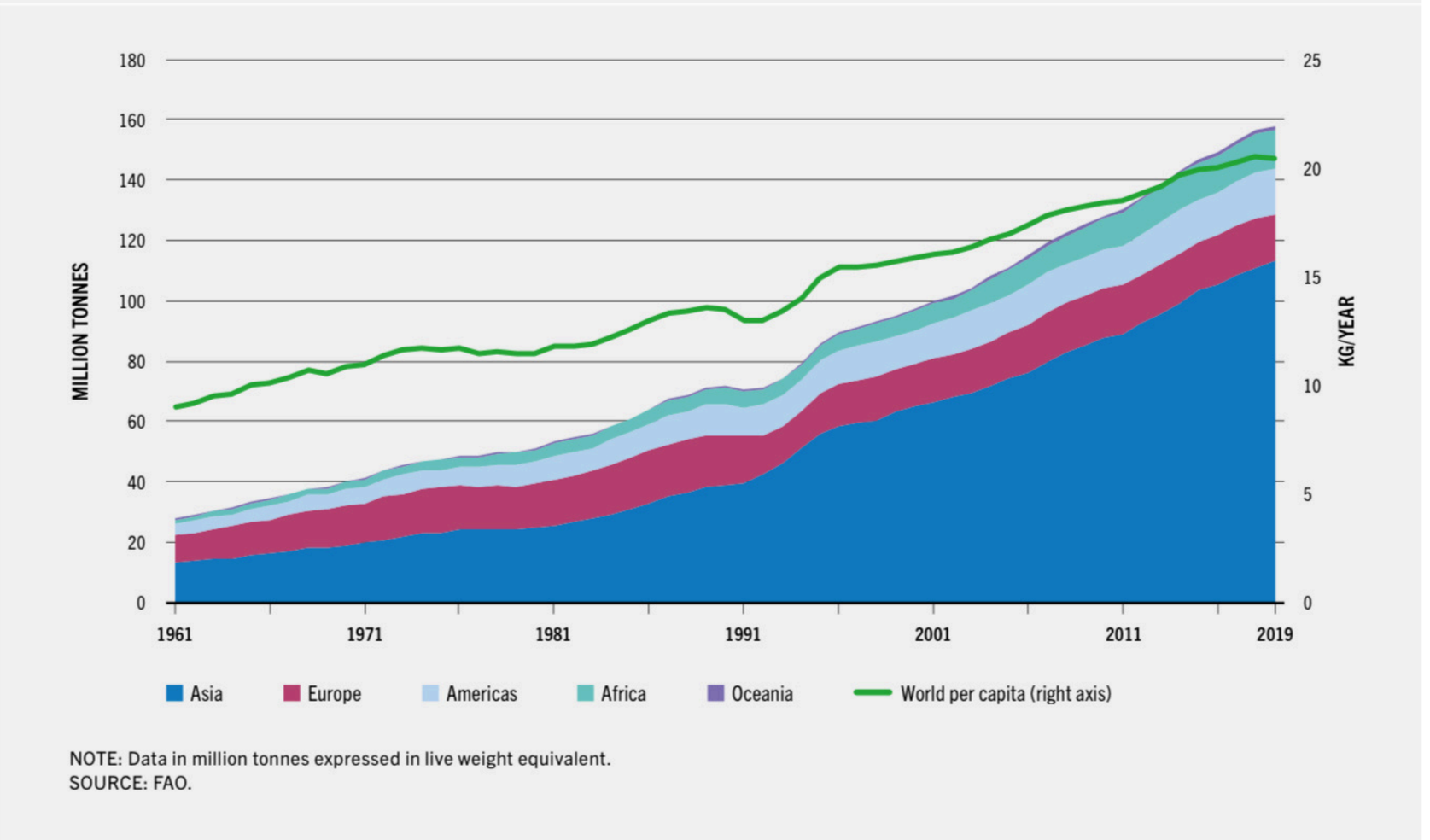
Aquatic food consumption by continent, 1961–2019.



NOTE: Data in million tonnes expressed in live weight equivalent.
SOURCE: FAO.

Shows rapid rise in fish consumption, particularly in Asia, which fuels demand pressure (FAO, 2022, p. 83).

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3 Poor enforcement and subsidies

- fisheries subsidies and weak monitoring allow fleets to continue fishing unsustainably, including IUU fishing.
- Subsidies reduce costs for industrial fleets, encouraging overcapacity.
- The OECD's Review of Fisheries (2025) reports that, between 2020–2022, nearly USD 10.7 billion annually was spent in government support, with 65 % of that posing moderate to high risk of encouraging unsustainable fishing. Only 29 % was investment in monitoring or enforcement, illustrating a troubling imbalance(IISD, 2025).

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The example of the collapes of tuna and cod stocks

- **Cod Collapse** (North Atlantic cod, Canada): The cod fishery was heavily exploited during the 20th century with increasingly efficient trawlers. By the early 1990s, cod populations crashed, leading to a moratorium on fishing and massive job losses in Canada. This collapse is a classic case study of overfishing, where open access, technological improvements (e.g., industrial trawlers), and poor management combined to drive the stock below recovery levels (Pauly et al., 2002).
- **Tuna Stocks**: Pauly et al. highlight how high-value species like tuna are especially vulnerable to overfishing because global demand drives intense exploitation. The development of long-distance industrial fleets with technologies such as sonar, radar, and large freezer vessels accelerated the depletion of tuna populations. These fleets, combined with weak international regulation, led to serial depletion of tuna species in many regions.

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Destructive Fishing Methods

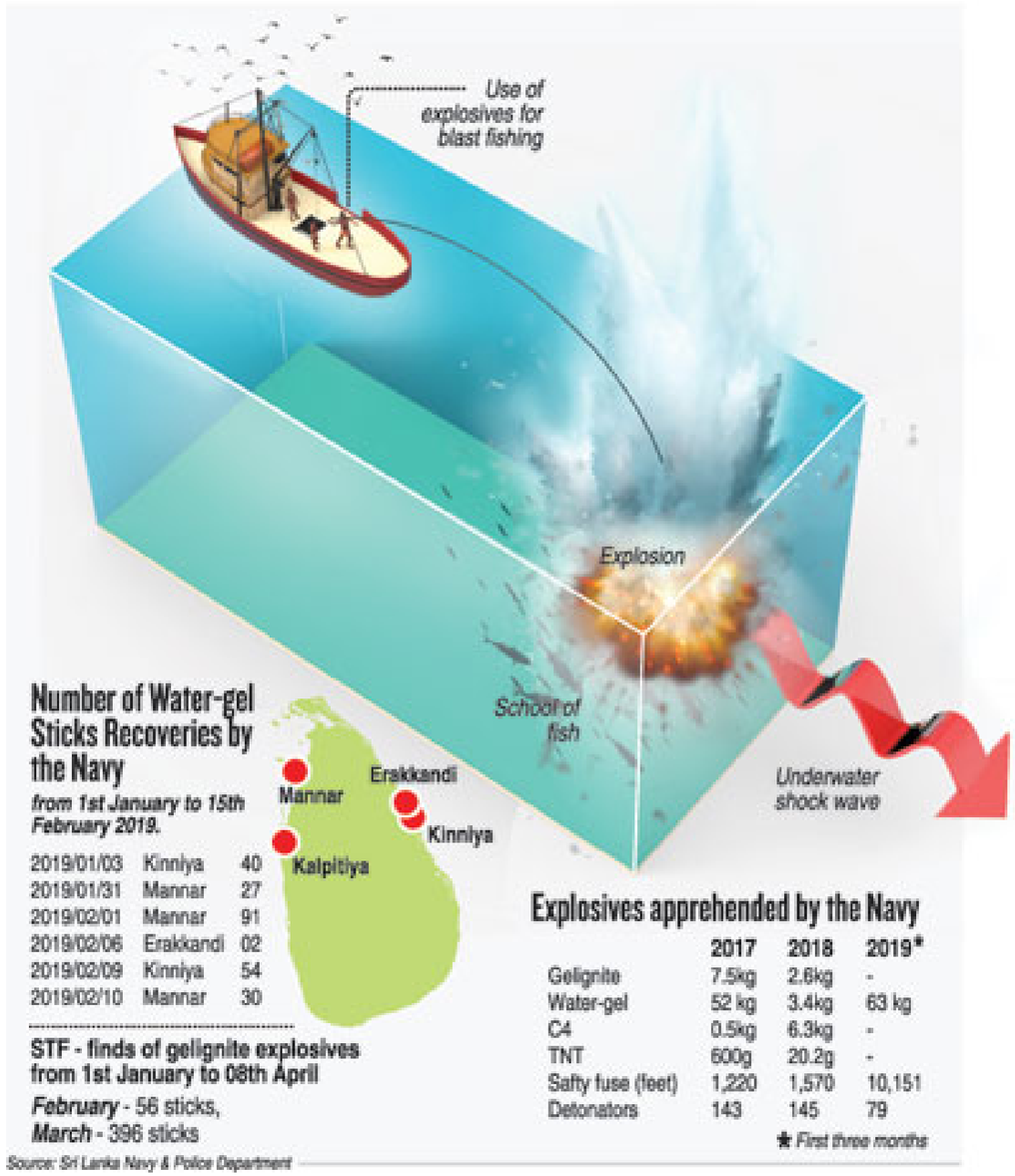
Blast (dynamite) fishing

- Blast fishing, commonly referred to as dynamite fishing, is an illegal and destructive form of fishing.

"Wave of Destruction"

- Dynamite fishing destroys coral reefs
- Coral tissue is killed, and rubble prevents nearby coral from recovering.
- Repeated blasting in shallow reefs leads to irreversible damage.

Source: Leisure Pro Staff, 2017



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Destructive Fishing Methods

Cyanide fishing

- Fishermen crush cyanide tablets into water and put it in a squeeze bottle.
- They dive near coral reefs and squirt the toxic mix at fish.
- The fish is stunned (not killed), making it easy to catch by hand or net.

kills coral and fish.

Cyanide fishing in coral reef, the Philippines.
© WWF / Jürgen Freund

Source: WWF, 2003

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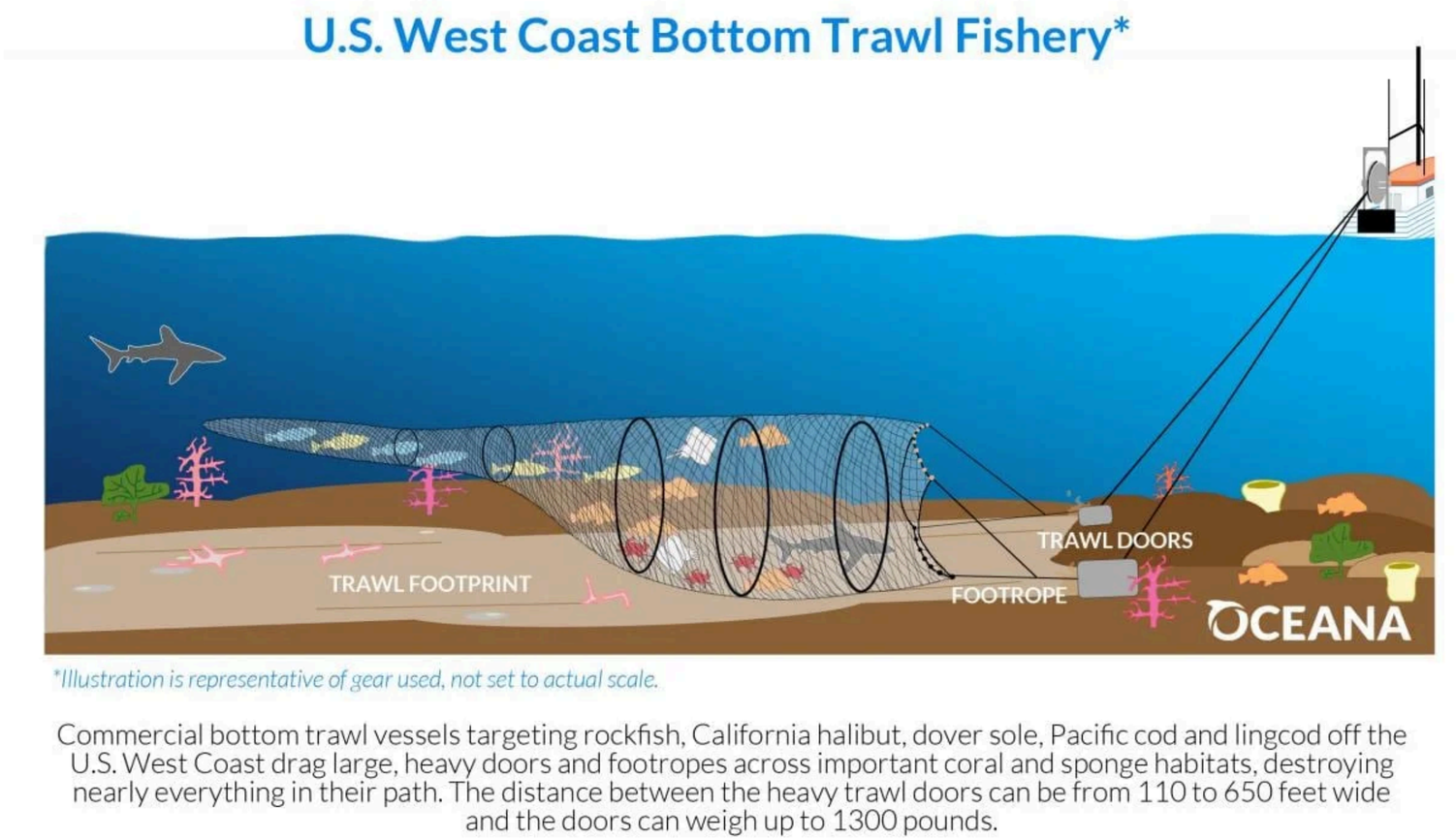
Destructive Fishing Methods

Bottom trawling

- Large weighted nets are dragged across the ocean floor, clear-cutting a swath of habitat in their wake.

destroys seabed habitats.



Source: Oceana, n.d.

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Destructive Fishing Methods

Ghost fishing

- Ghost fishing refers to the continued capture of marine organisms by lost or abandoned fishing gear, such as nets and traps, which remain active for extended periods without human oversight.

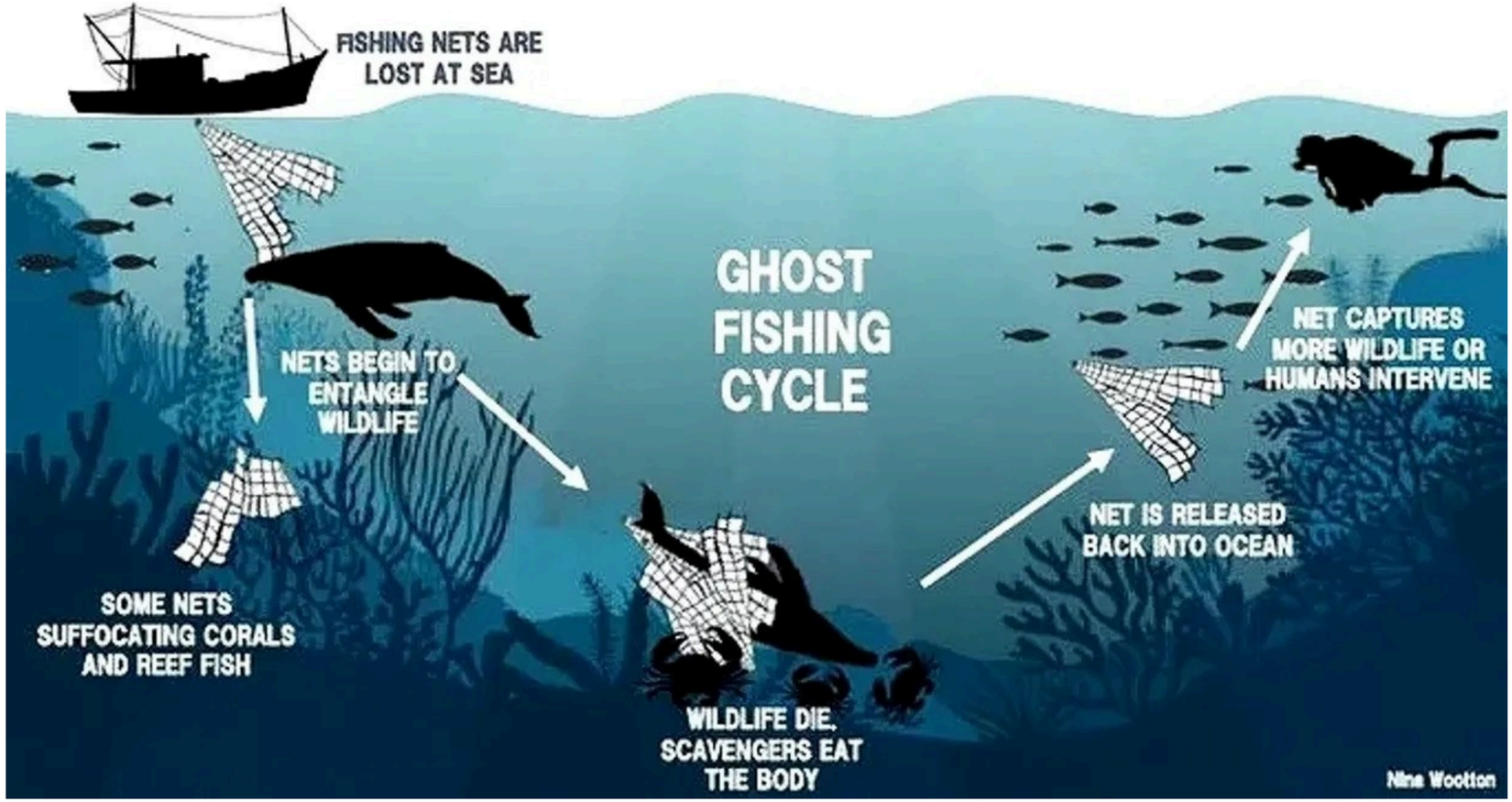

image credit : Dr Nina Wotton, University of Adelaide , 2018

the mortality of both target and non-target species, including endangered taxa, degradation of marine habitats, economic losses to fisheries, and increased marine pollution.

Source: NOAA Marine Debris Program, 2015

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Impacts of Unsustainable Fishing

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- Collapse of fish stocks and ecosystems.
- Loss of coastal livelihoods and food sources.
- Biodiversity decline and trophic imbalances.
- Long recovery times for ecosystems.
- the impact to consumers and the fisheries industry.

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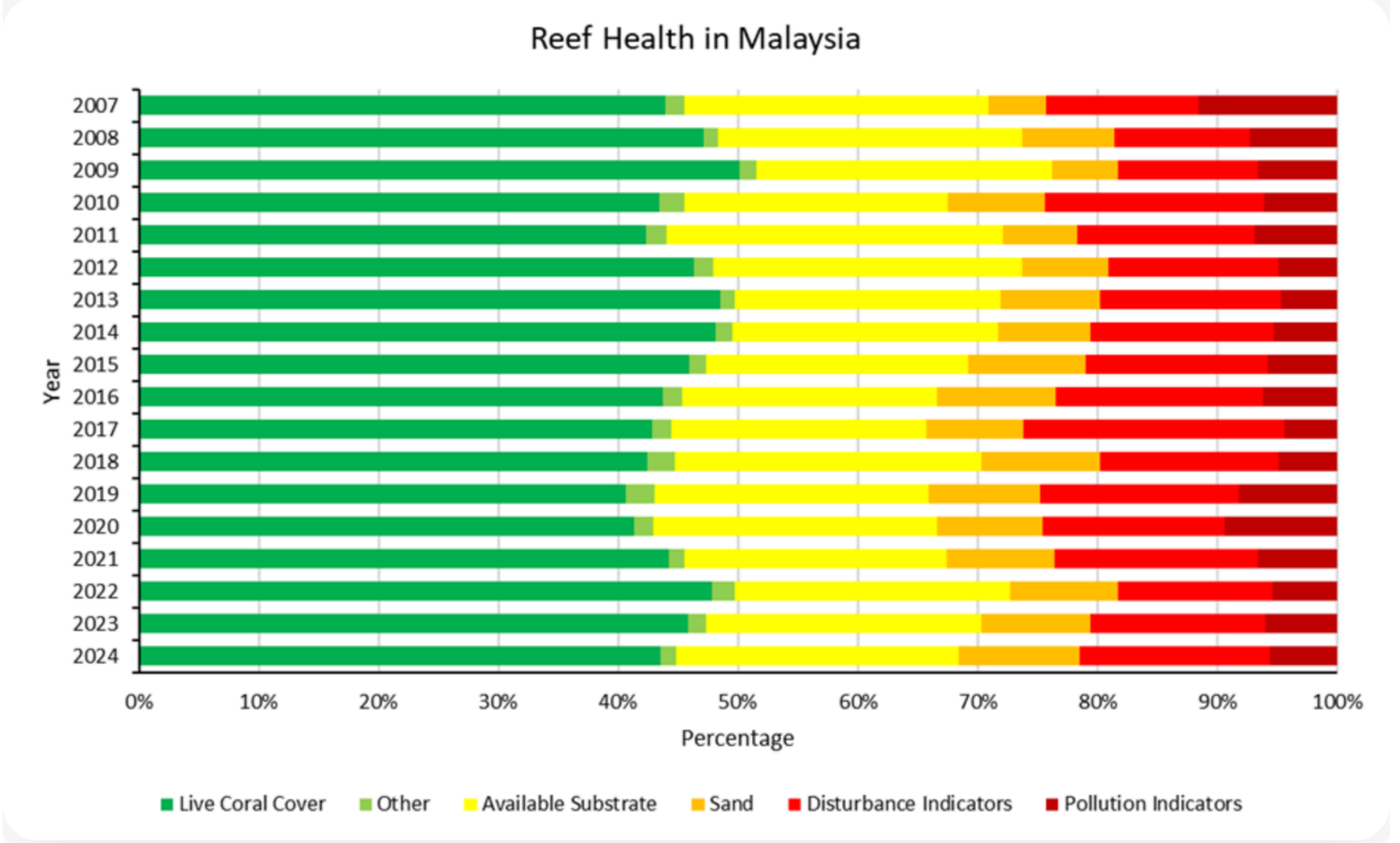
Reef Check Malaysia's Annual Survey Report 2024

- the 2024 surveys indicate that LCC declined from 45.9% in 2023 to 44.7% in 2024, continuing a trend that originates from 2022.



Source: Reef Check Malaysia. (2024)

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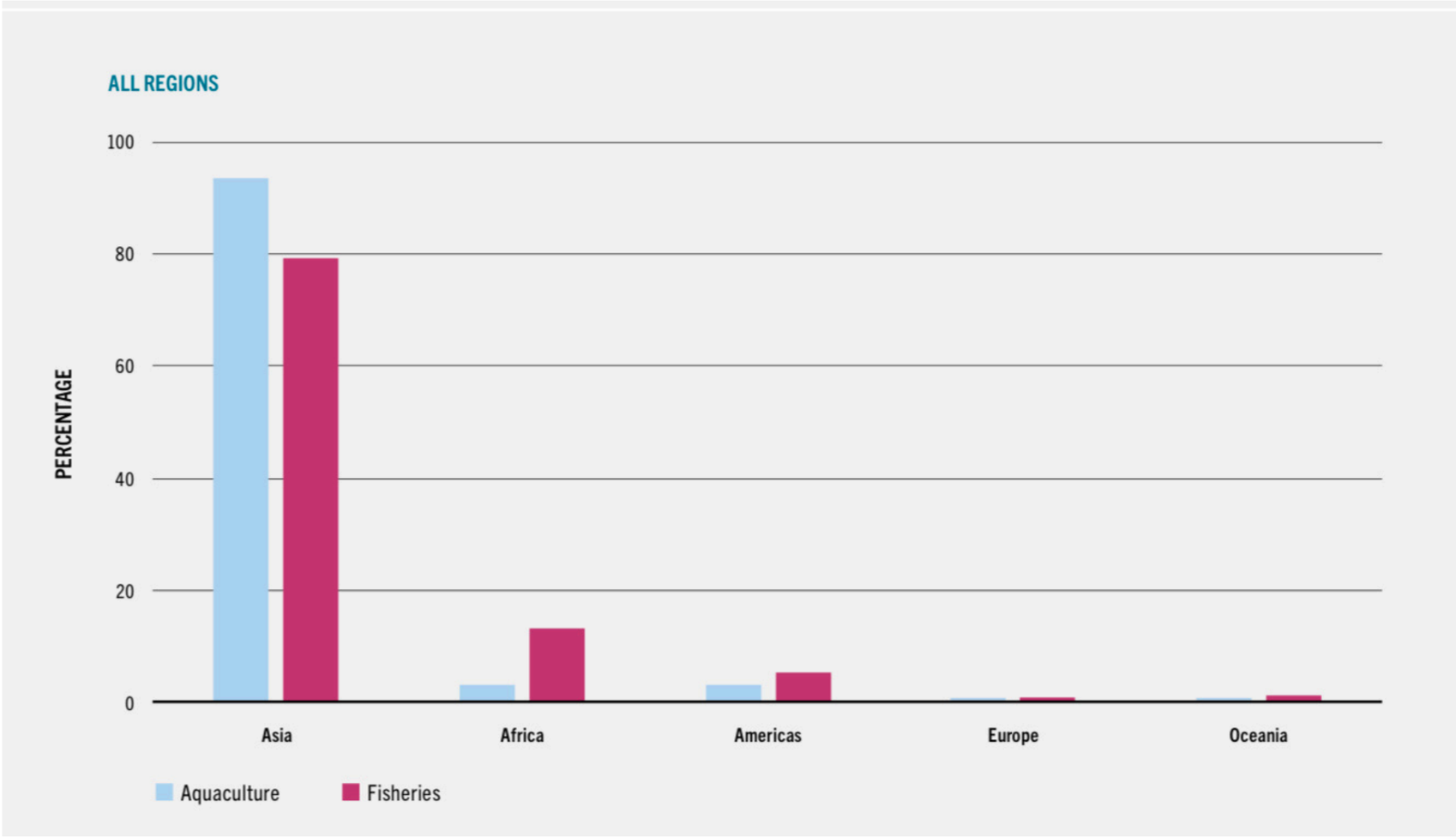
Share of employment in the primary sector of fisheries and aquaculture by cintinent

- the global economy depends on fisheries for jobs — about 60 million people employed directly in fishing and aquaculture (FAO, 2022, p. 65). Overfishing puts these jobs at risk.



Source: FAO, 2022

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Activity: Role-Play Discussion

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- **Scenario: A coastal fishery is collapsing.**
- **Roles: Fisher, Fisheries Officer, Conservationist, Local Vendor.**
- **Each participant presents their viewpoint.**
- **Discuss compromises and management solutions.**

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summary

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Overfishing and destructive practices

threaten

sustainability

can prevent

Foundation for exploring solutions in next units.

+

Need for urgent action via policy, enforcement, and education.

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THANK YOU

ASSOC. PROF. DR MAHADI MOHAMMAD

+6012-472 2912

mahadi@usm.my

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