



Food and Agriculture
Organization of the
United Nations



Fuel saving technologies and methods for multi-day fishing vessels

Workshop on fuel savings in fisheries Sri Lanka

22 May 2024

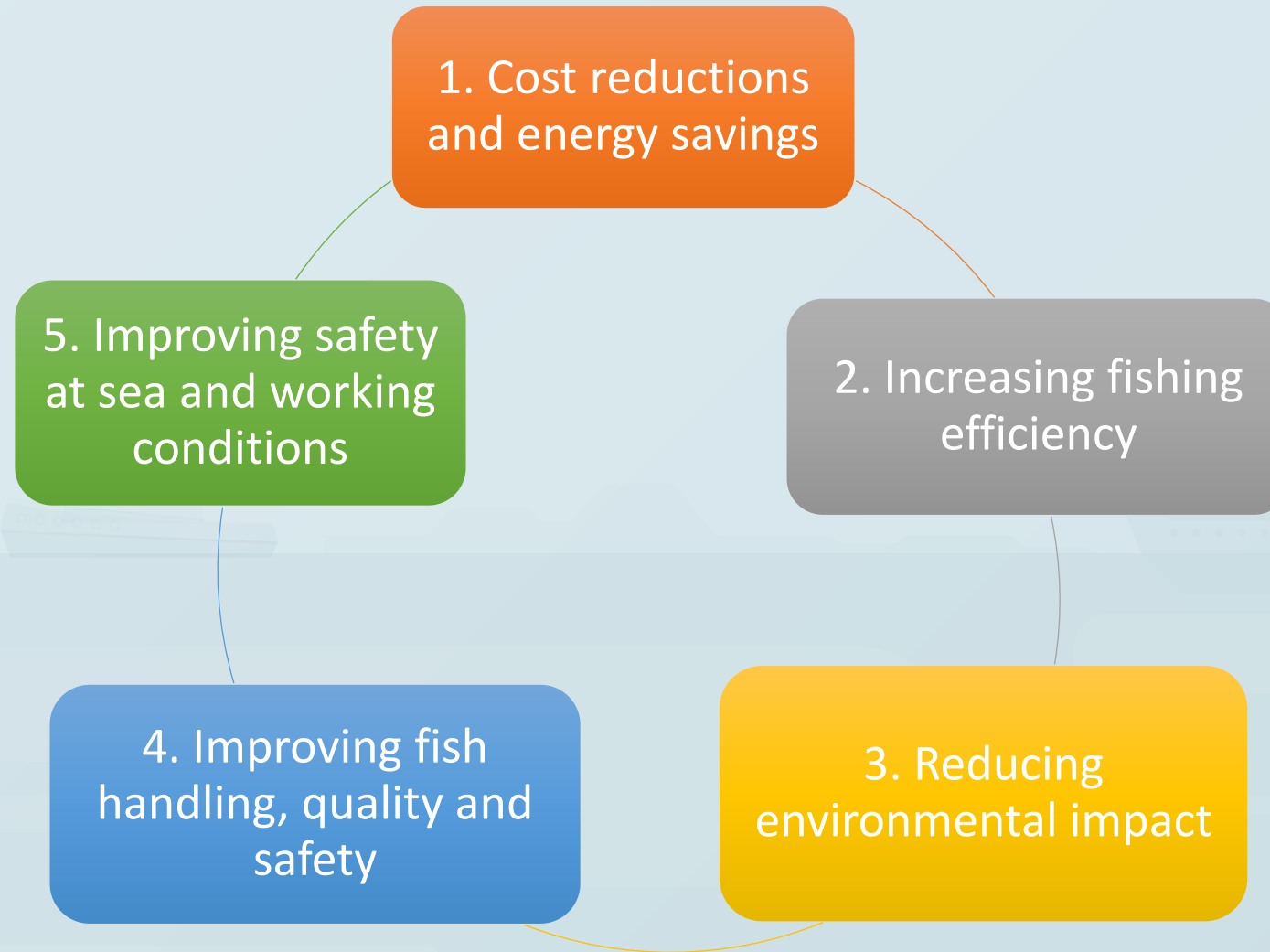
by Raymon van Anrooy

Outline

- 1 Improving fishing vessel performance in Sri Lanka
- 2 Energy savings - engines
- 3 Energy savings - propulsion
- 4 Energy savings – vessel hulls
- 5 Increasing fishing efficiency - technology
- 6 Increasing fishing efficiency - longlining

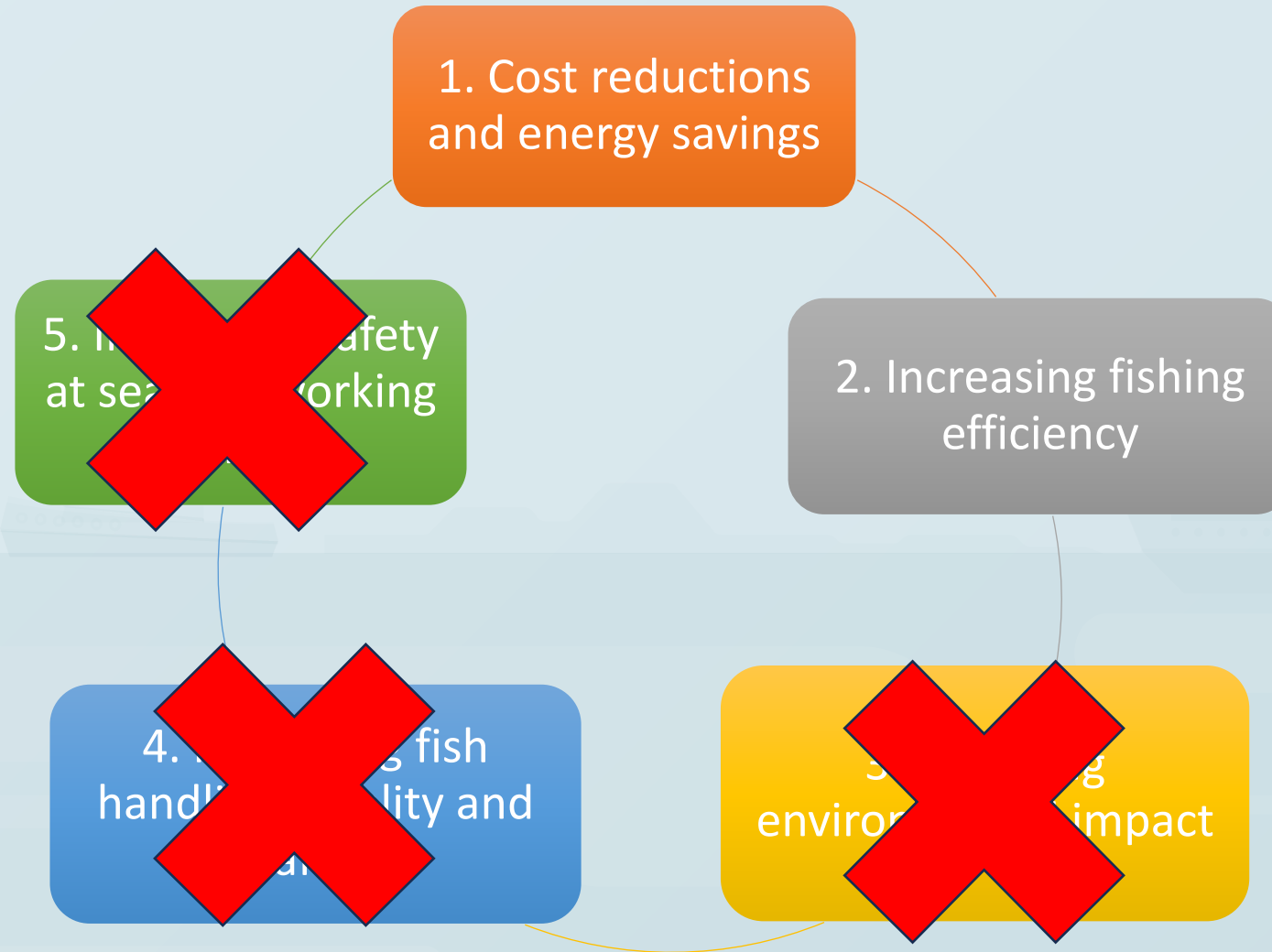
Improving Sri Lanka's multiday fishing vessel performance

Five areas for improvements



Improving Sri Lanka's multiday fishing vessel performance

Five areas for improvements



1. Cost reductions and energy savings (Engines)

320 HP (235kW)
Hyundai Marine Diesel
engine (2005) = 61 ltr/h



250 HP (184kW)
Yanmar Marine Diesel
engine = 25 ltr/h



344 HP (279kW) Isuzu
Marine Diesel engine =
40 ltr/h



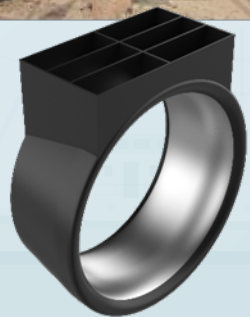
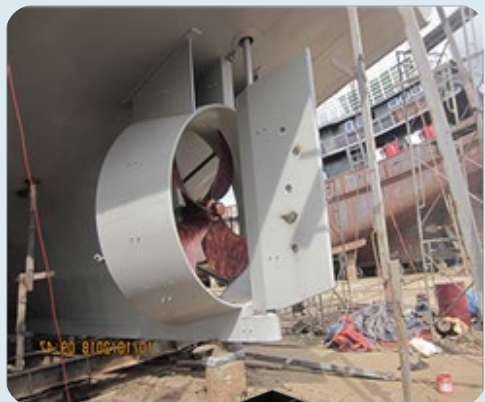
Modern engines

- **More fuel efficient**
- **Higher horse power**
- **Lower weight**
- **Lower emissions**
- **Reduced maintenance**
- **Less noise**

But

- **High initial investment costs?**
- **Complicated technology?**
- **Spare parts available?**
- **Hull modifications needed?**

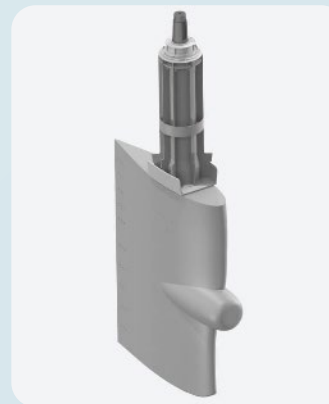
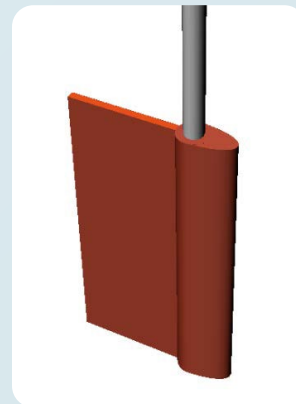
1. Cost reductions and energy savings (Propulsion efficiency)



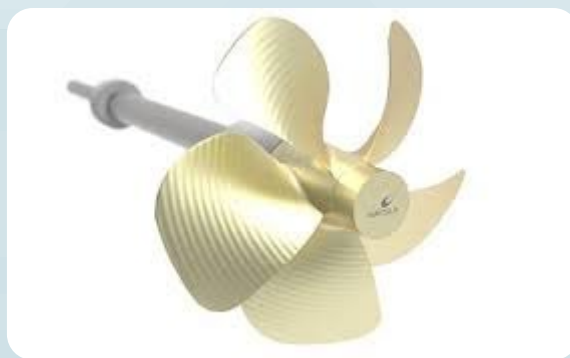
Ducted propeller (nozzle) for thrust improvement



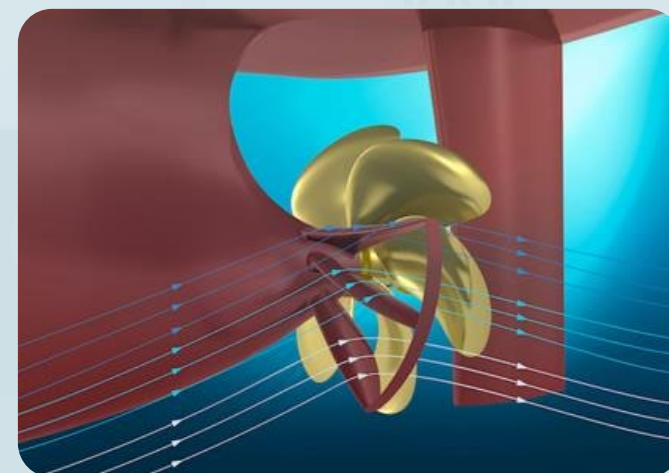
Stern and rudder improvements for reducing resistance



Silent bulb on rudder for increased thrust and reducing resistance



Propeller design that decreases propeller resistance and increases thrust

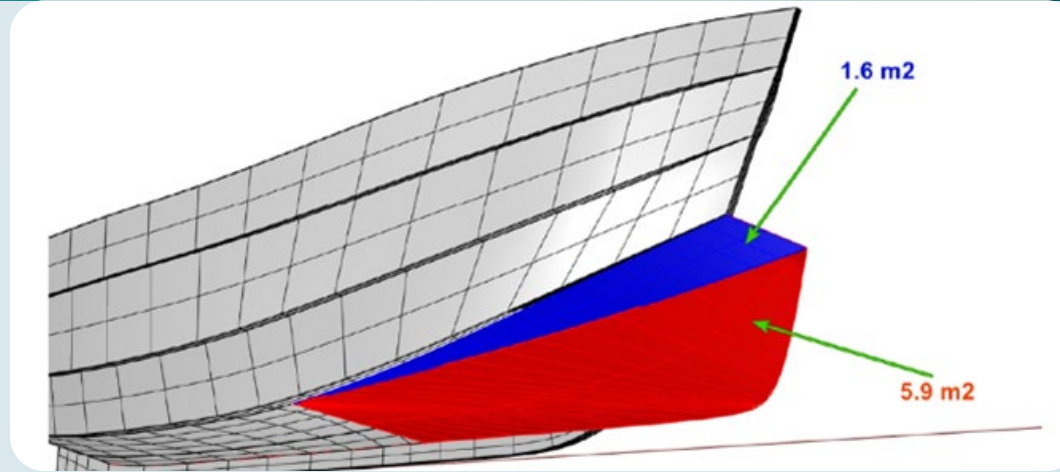


Pre-swirl stator fin increasing fuel efficiency

1. Cost reductions and energy savings (vessel hulls)



Stabilizing fins reduce rolling, increase stability and support vessel efficiency

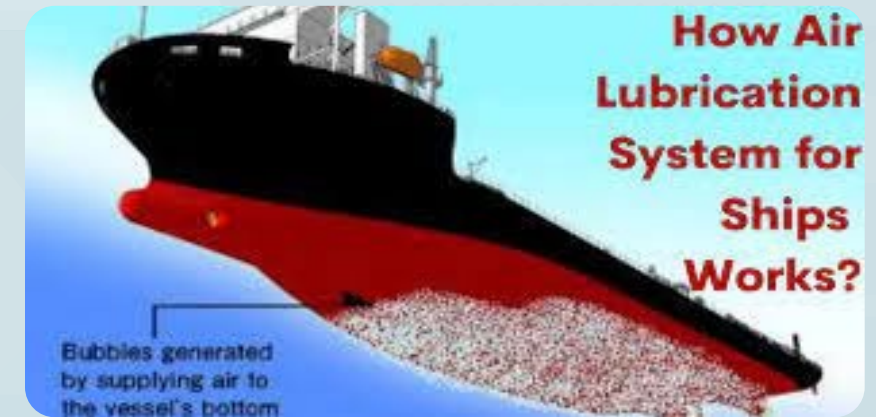


Dihedral/bulbous bow for wave making reduction

A clean hull and anti-fouling coating reduce drag and resistance



Sources: FAO, Wartsila



Air lubrication system reduces the frictional resistance of the hull

1. Cost reductions and energy savings (more vessel hulls)



HDPE hulls – lighter than water, wave impact resistant, fouling resistant, available for any design



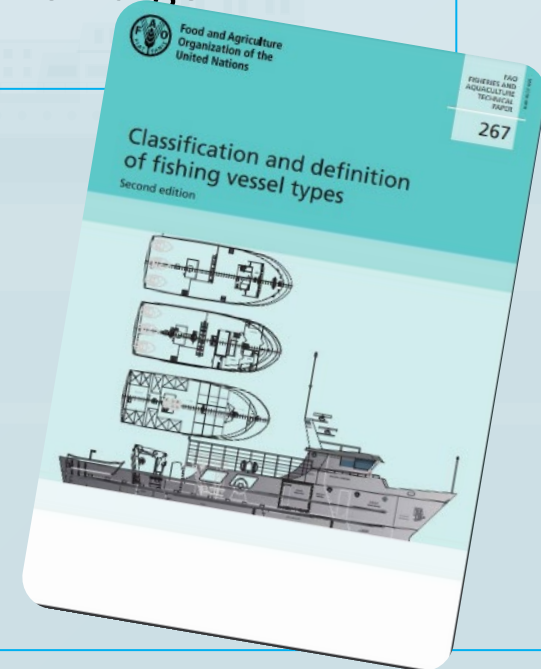
Multihull vessels designs bring fuel efficiency benefits



Semi-planing hull for larger FRP fishing vessels



Asian midwater tuna longliner and European type longliner (45m)

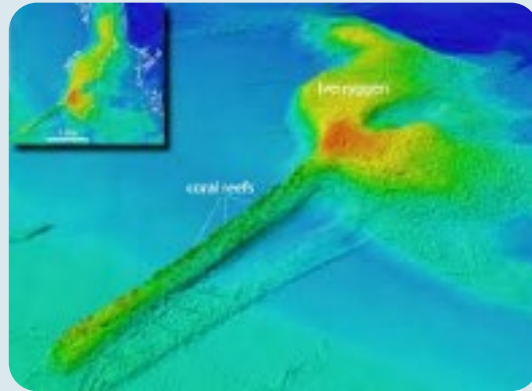


Sources: Tideman, MA/MCCF, Yamaha

2. Increasing fishing efficiency (Technology)



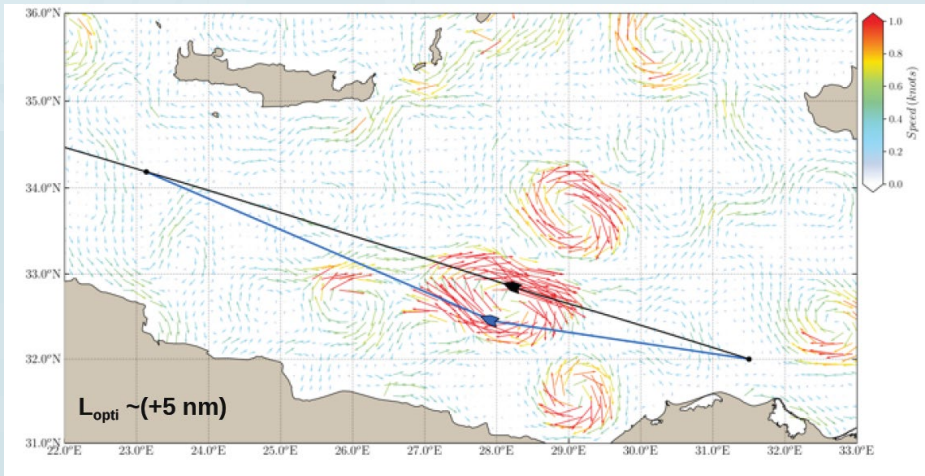
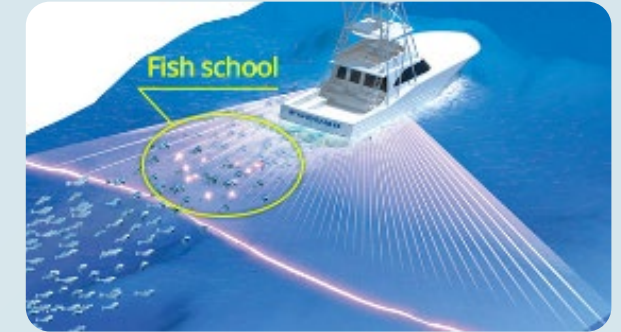
GPS



Seabed mapping



Fishfinders – multibeam sonar

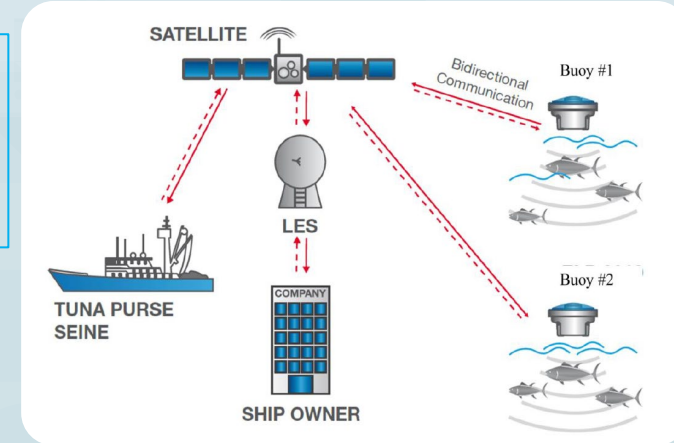


Route optimization at sea

Transshipment at sea



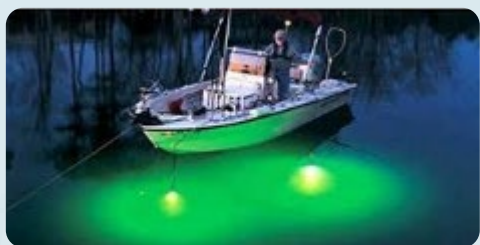
Smart Fish Aggregating Devices (FADs)



Sources: FAO, ESA, NOAA

2. Increasing fishing efficiency (Gears)

Biodegradable and collapsible traps

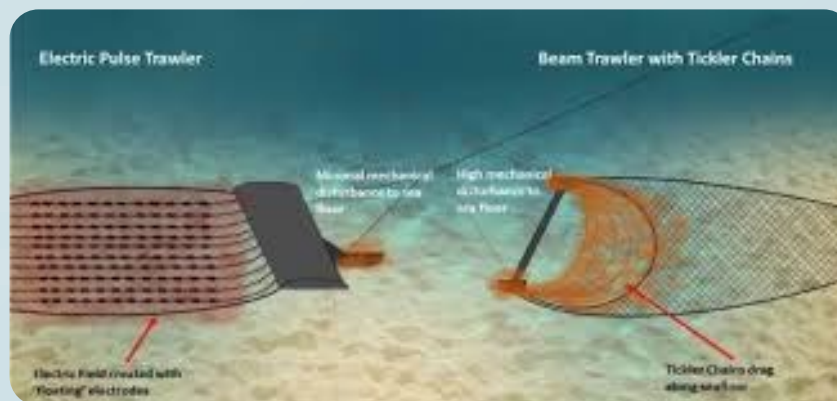


Multi-purpose fishing vessels

LED light use in night fishing



Electric pulse trawl



2. Increasing fishing efficiency (C) (Longline fishing)



Circle hooks – less bycatch = more efficiency



Nylon leaders – less shark bycatch



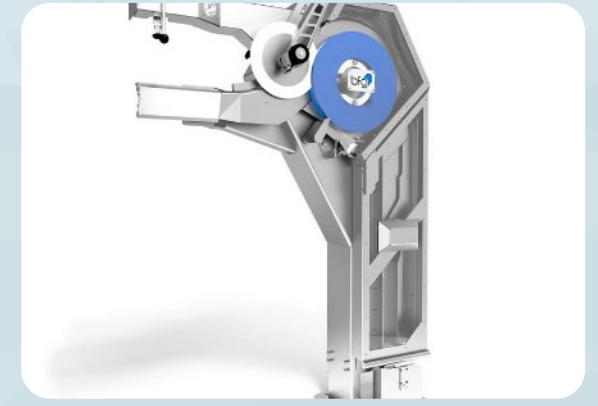
Artificial bait



Line setting machine



Hook cleaner and hook separator



Thank You

Any questions or observations?

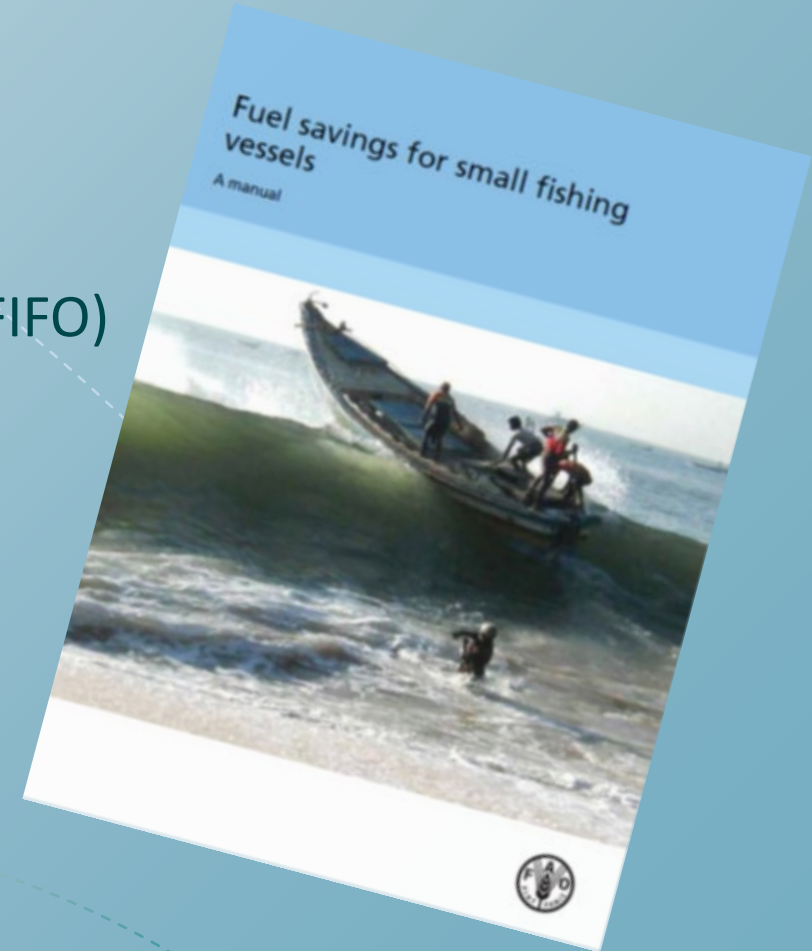
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Useful references

Sources	Weblinks
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Classification and definition of fishing vessel types: second edition	https://doi.org/10.4060/cc7468en
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State of World Fisheries and Aquaculture 2022: towards Blue Transformation	https://doi.org/10.4060/cc0461en
Blue Transformation - Roadmap 2022–2030	https://doi.org/10.4060/cc0459en
Safety Recommendations for Decked Fishing Vessels of Less than 12 metres in Length and Undecked Fishing Vessels	https://www.fao.org/documents/card/en/c/3d78177f-bfeb-5566-ae97-a4cb55984b4f
Fuel savings for small fishing vessels: a manual	https://openknowledge.fao.org/handle/20.500.14283/i2461e