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## **FISHERIES BY-CATCH: PROBLEMS AND SOLUTIONS**

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### **Abstract**

Bycatch from fishing is a major hazard to marine megafauna species all over the world. Bycatch of long-lived marine megafauna has both direct and indirect biological consequences, lowering megafauna populations and altering ocean trophic dynamics. Simultaneously, significant progress has been made in the improvement of mitigating methods. These accomplishments are noteworthy, yet there are still some critical information gaps and the requirement for innovation.

### **Introduction**

Unintentional capture of non-targeted species, known as bycatch, is widely recognised as a significant hazard to marine life. Air-breathing megafauna, such as marine mammals, turtles, and seabirds, are particularly vulnerable to bycatch, and have been documented as bycatch in more than 90 nations. The bulk of these bycatch incidents have been an outcome of static entangling nets and longline fishing.

Many fishing gear are non-selective, snagging animals that aren't supposed to be caught. Bycatch is the term for this non-target excess catch. Some of the species caught as a result of bycatch have commercial worth, and fishermen bring them back to shore to sell them. However, a considerable percentage is rejected and thrown back over the side of the boat. Bycatch kills hundreds of thousands of sea turtles, seabirds, and marine mammals like whales, dolphins, and porpoises. Thousands of oceanic birds were killed when they became entangled in nets or hooked on longlines while diving for bait.

### **Bycatch –problems**

Non-target animals like dolphins, marine turtles, and seabirds are captured during the fishing operation and are known as bycatch. Thousands of kilometres of nets and lines are spread every day over the oceans. Modern fishing gear is highly effective at catching the desired fish species— as well as anything else in its path. It is often invisible to the naked eye and extremely strong. Turtles, dolphins, and juvenile fish are among the marine species hauled up with the catch and then thrown overboard.

Approximately 20% of species of sharks are on the verge of extinction, owing largely to unintentional capture in longlines. According to the FAO, 7.3 (mt) million tonnes of fish are thrown away each year. Each year, fishing kills approximately 250000 loggerhead and leatherback marine turtles, as well as 1 billion sharks, three lakhs of small whales, and dolphins. The fishing industry's leaders are becoming increasingly aware of the need to reverse this trend. There are tried and true solutions, such as modifying fishing nets to catch fewer non-target species or letting them to flee. These adjustments are frequently simple and affordable, and they are frequently made by fishermen themselves.

Bycatch is still a major concern, despite contemporary technologies and industry awareness of the issue. Not only can it result in preventable fatalities and injuries, but the fishing methods used can also be damaging to the marine habitats. By collaborating with fisheries and helping to develop and promote innovative technologies and gear for more effective operations, WWF hopes to decrease bycatch.

- Bycatch occurs as a result of modern fishing being highly efficient, frequently covering enormous areas of water, and often being highly unselective, catching not only the target species but also a wide range of other marine organisms.
- In certain nations, poor fisheries management exacerbates the problem.
- Ignores net mesh size restrictions, quotas, and legal fishing zones.
- Most fishing gear is non-selective, which means it can capture any species, including some that aren't meant to be caught.
- Longlines, trawling, and the use of gillnets are the most common fishing methods that result in bycatch.
- Longlining is a commercial fishing technique used to catch swordfish, tuna, and halibut that involves suspending hundreds or thousands of baited hooks along a single fishing line.
- The hooks (commonly called "J hooks") cause problems for marine turtles when swallowed, usually resulting in death.
- Sharks, non-target billfish, and immature tunas are also frequently caught..
- Trawling involves vessels dragging giant nets through the seabed, collecting practically anything in their path, including coral reefs and marine turtles at shallow depths. Bycatch happens when nets capture anything larger than the mesh, such as young fish, sharks, seabirds, marine turtles, and cetaceans (whales, dolphins, porpoises).

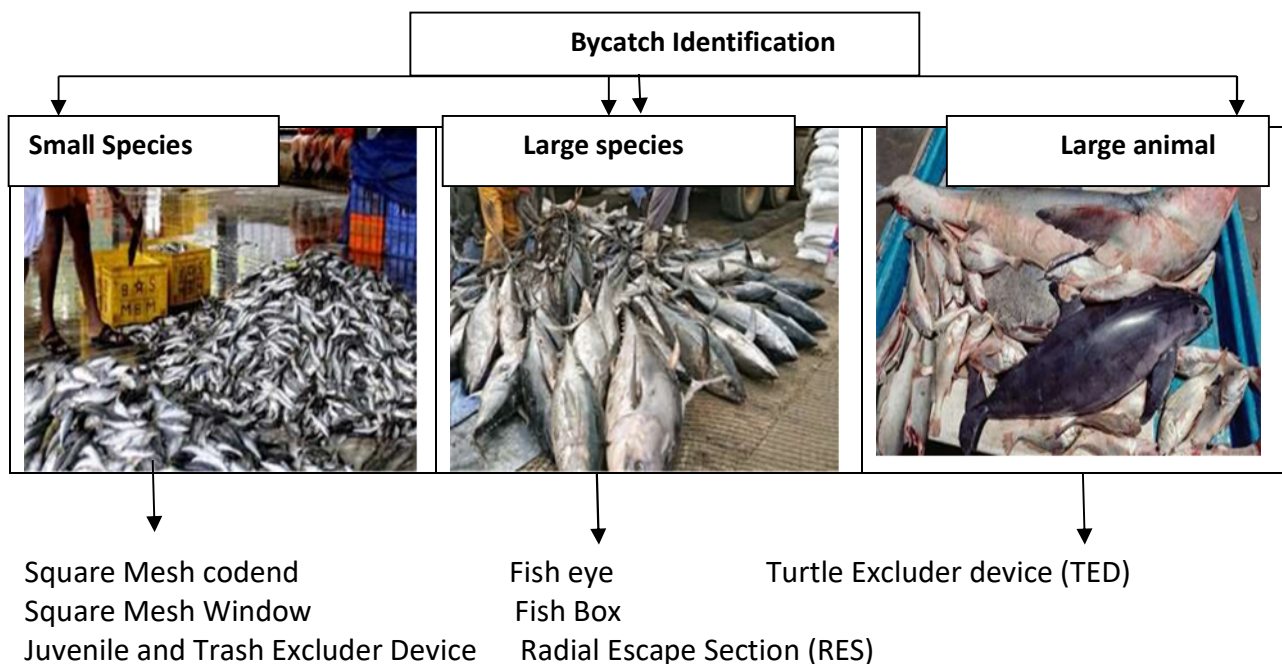
#### **Bycatch control and Solutions**

- Species-selective gear: use and development
- Control and monitoring of fishing nets
- Increasing gear selectivity through technical conservation techniques..
- Closed or protected areas are utilized to protect juvenile and spawning fish.
- Management and marketing techniques for the fishing industry
- State's laws for prohibiting discards & over grading.
- Devices should be used to reduce bycatch.
- Using mesh sizes that are large enough to allow some small animals to escape
- Use of TEDs and BRDs.

Bycatch reduction strategies that have been proven to work exist, and new ones are being developed. The World Wide Fund for Nature (WWF) and its partners are trying to develop, test, and adopt alternative fishing gear, as well as to incorporate conservation knowledge into successful fisheries management. In addition, the WWF and its allies are striving to enhance bycatch legislation and raise consumer awareness of sustainably caught fish.

"Circle" hooks are being introduced by WWF in collaboration with partners. When swallowed by turtles, these hooks are significantly less likely to cause suffocation or internal bleeding than J-shaped hooks. Working with the Inter-American Tropical Tuna Commission (IATTC) and other partners, WWF implemented the hook in eastern Pacific longline fisheries. As a result, the number of marine turtles killed could decrease by up to 90% while swordfish and tuna catches remain unaffected.

The first step in decreasing bycatch is to determine which types of bycatch should be avoided.



**Bycatch Reduction Devices:** Usually refers to technologies that are expressly designed to reduce fish bycatch and other small animals and detritus capture.

**Square - Mesh cod end:** A shrimp trawl with a square-mesh codend is meant to keep small fish out. Traditional diamond-mesh codend mesh holes collapse as it fills with capture, preventing little fish from escaping. The mesh apertures of square mesh codend, on the other hand, keep their shape as the mesh fills with catch and are available for fish to escape.

**Square- Mesh Window:** A square-mesh window is a netting panel with square mesh netting that is located in the top panel of the codend or trawl body. Fish swim through the square escape apertures as they pass through the trawl, orienting themselves in a direction towards the device.

**Juvenile and Trash Excluder Device :** This device is used to keep small fish out of the trawl, mainly juveniles or garbage fish, so that large fish can be caught.

**Fish eye:** A fisheye is an oval steel or aluminium frame attached to the codend through which fish can swim to safety. Fisheyes are typically placed near the top or sides of the codend to allow strong swimming fish to escape while shrimp enter the codend passively.

**Fish Box:** The purpose of a fish box is to change the flow of water in the codend. It's a box-like device attached to the top or bottom of the codend with an aperture for fish to swim through and escape.

**TED:** Any trawl alteration that reduces turtle capture is known as a turtle excluder device. Because they can prevent the capture of other large species including as sharks, stingrays, jellyfish, and some large fish, these devices are frequently referred to as trawl efficiency devices.

### Conclusion

To reduce bycatch and discarding, the bulk of research suggested combining mitigation strategies such as gear modifications and fleet communications. Furthermore, collaborative programmes that bring together the knowledge of fishermen, scientists, and management have been shown to be more effective in reducing bycatch.

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