

Annex 6

付属資料6: 零細漁業者のための曳き縄漁マニュアル  
(第2回FAD漁業・管理ワークショップ)

## Trolling for Artisanal fishers

2<sup>nd</sup> Workshop for Development and Management of  
Fish Aggregation Device (FAD) Fishery



Project of Promotion of Grace of the Seas in the Coastal Villages,  
Phase 2, in the Republic of Vanuatu

Vanuatu Fisheries Department  
Japan International Cooperation Agency  
IC Net Limited

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## 1. What is Trolling? (Principle of Trolling)

- ✓ Trolling is the most active type of angling operation.
- ✓ The vital points involved in this fishing process include: 1) the location and pursuit of schools of fish, 2) setting the proper trolling depth for the fishing line and 3) the performance of the fishing hook and bait
- ✓ Targets are the migratory fishes who come to the same place at the same season of every year and form the fishing ground
- ✓ Trolling is the fishing method utilizing fish's behavior; their reactions to a changeable sound and movement

## 2. Main target species



**Yellow-fin Tuna**



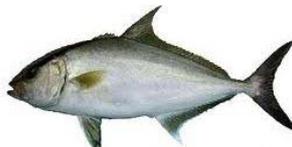
**Skip jack**



**Rainbow runner**



**Dolphin fish**



**Amber jack**



**Wahoo**

### 3-1. Where fish gather? (How to find out the fish school)



Flock of bird



Floating raft or FAD



Whale shark

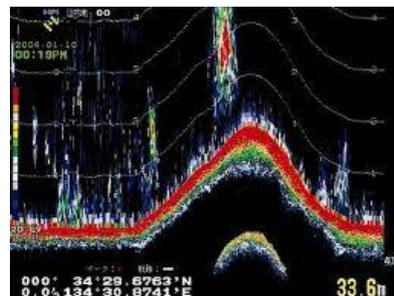


Fish school

- ✓ The place where fish can escape from predator
- ✓ Existence of bait fish
- ✓ Appropriate place of tide velocity and water temperature
- ✓ Appropriate water quality and salinity condition

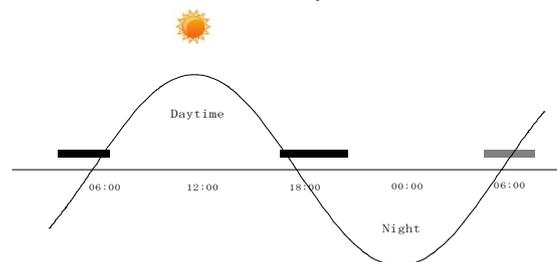
### 3-2. Where fish gather? (How to find out the fish school)

- ✓ Fishing grounds are formed around the **upwelling place**; such as the vicinity of **offshore banks, boundary of water masses (currents)**
- ✓ The plankton is generated in the vicinity of the surface of the sea when the deep seawater nutrition comes up.



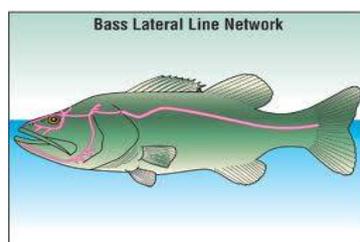
## 4. Diurnal behavior of pelagic fish

- ✓ Fish comes up to the shallow water layer for preying
- ✓ Main preying time of pelagic fish at dawn and dusk time
- ✓ When the sun blazes on the surface of the sea, the fish school swim deeper layer of the sea
- ✓ Under the dark and bad weather condition, pelagic fishes sometime come up to surface of the sea



## 5. Reaction of fish to fishing gear

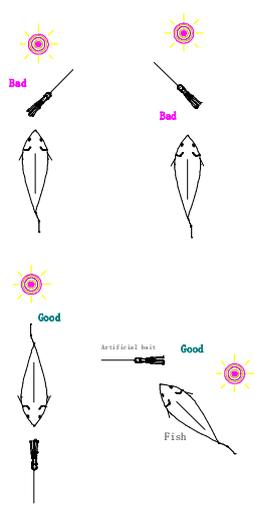
- ✓ Fish sensitively react to a changeable sound and movement
- ✓ The sounds influence fish most in seawater
- ✓ The lateral line works as an ear of fish
- ✓ Fish can sense not only sound but also water pressure, velocity, smell and taste by using of their lateral line



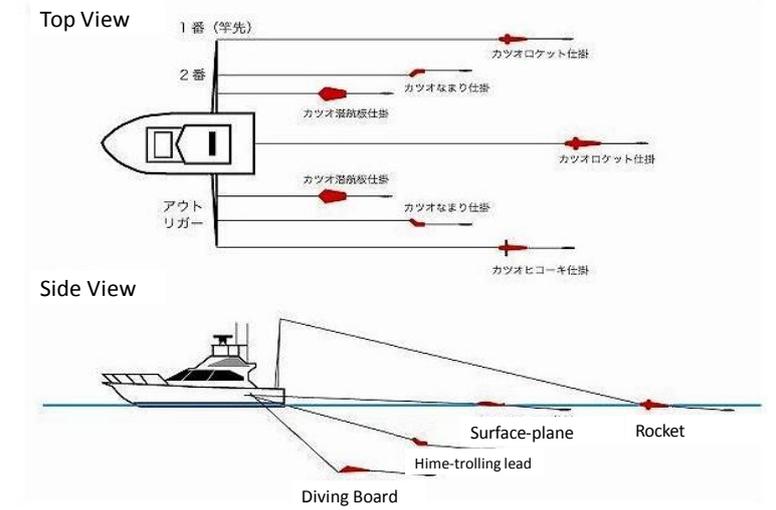
## 6. Trolling depth

- ✓ Fish change their migrating depth according to factors such as **time of day**, **water temperature** and **their degree of appetite**. To achieve good fishing results, one must fish at different depths; from **the surface** to **the middle depths**.
- ✓ To make the line and hooks troll at desired depth, devices such as a) **a diving board** and 2) **a surface-plane**, etc., are used.

## 7. Trolling direction in relation to the sun

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- ✓ After a school is located, the boat approaches the school in a way that will not disturb their movement, and begin the trolling process, sweeping in front of the school at a speed of 2 to 4 knots.
  - ✓ During this process three factors must be considered; 1) **direction of sun**, 2) **the movement of the boat** and 3) **the movement of the fish**
  - ✓ When the fish is hooked, that fish becomes a **decoy**, some fishes are lured to other artificial baits and bite it

### 8-1. Several types of trolling gear (Trolling line arrangement for skipjack)

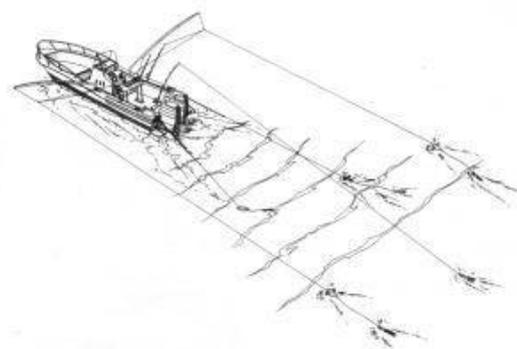


### 8-2. Several types of trolling gear (Surface splashing devices)

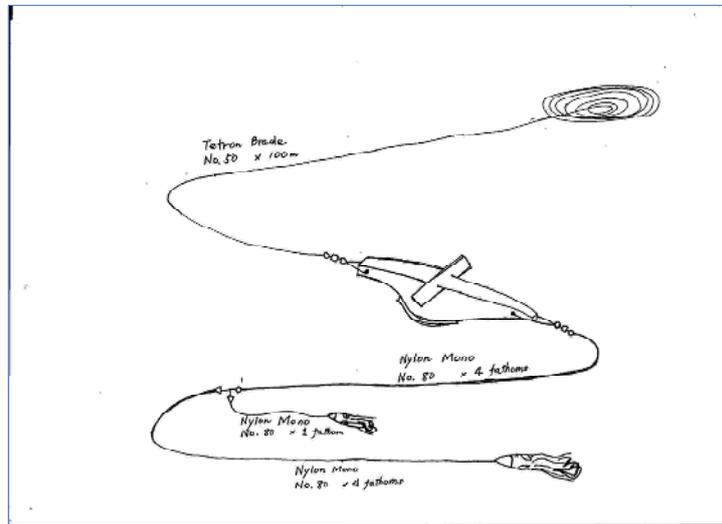


These gears send out the sound and splash water in the surface of the sea

Fishes are attracted by the function of these gear and come to bite the artificial bait by mistake



### 8-3. Several types of trolling gear (Diagram of Surface splashing devices)



### 8-4. Several types of trolling gear (Jumping device & line with a series of lead)



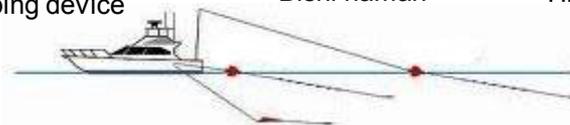
Jumping device



Bishi namari



Hime-trolling lead



- ✓ Bishi namari can work under the water by a series of lead which were attached to the main line
- ✓ Jumping device jumps on the surface of the sea so artificial bait attracts fishes by irregular action
- ✓ Hime-trolling lead keeps the main line under the water

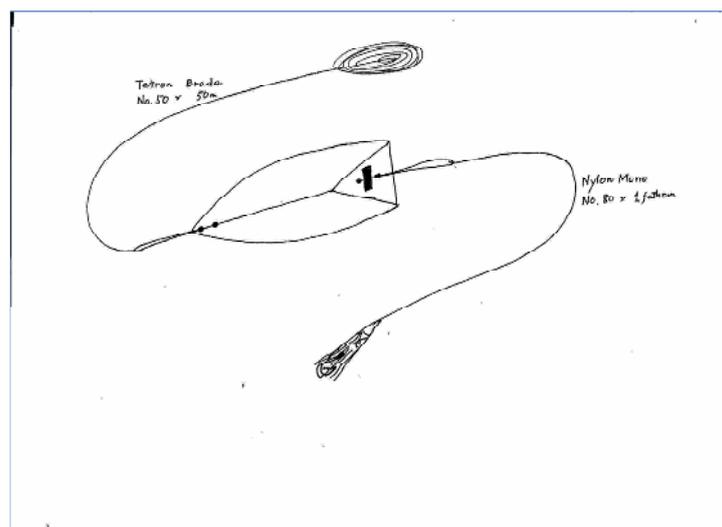
### 8-5. Several types of trolling gear (Diving board)



Diving board

- ✓ It is said that catching ratio is improved when the diving board moves right and left violently
- ✓ Fixing thread to rear center part of diving board for preventing the diving board from jumping
- ✓ The length of line between artificial bait to diving board is less than 2m

### 8-6. Several types of trolling gear (Diagram of Diving board)

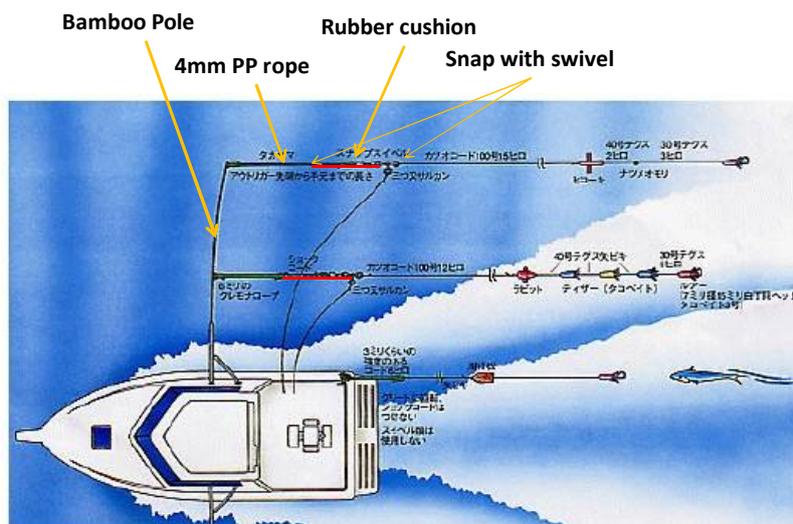


## 9. Artificial bait

- ✓ Artificial bait size is adjusted as like a real size of bait
- ✓ Artificial bait should move to be like alive
- ✓ Artificial bait should sometimes sparkling like the sardine
- ✓ The hook position is the end of artificial bait
- ✓ Hook have to move freely
- ✓ The cushion rubber is used to reduce the shock



## 10-1. Trolling out-rigger (beam) arrangement



## 10-2. Trolling out-rigger (beam) arrangement



## 11. Types of fishing around FAD

### 1. Trolling

Trolling with artificial bait are commonly used to target live bait, bonito and small tuna, for drop line. Depending on size of targets, the size of hook and artificial bait are changed. Dolphinfish and wahoo also are caught by trolling.

### 2. Hand line with bait

Hand line with bait are normally targeting dolphinfish and wahoo, which make school around floating objects and FAD. Crushed pieces of fish are also used to attract fish around a boat.

### 3. Drop line (drift line) with live bait

Drop line is a kind of drifting vertical longline, which target large pelagic species, such as yellowfin tuna and marlin, in the mid-water layer. Use of live bait, such as bonito, small tuna, jacks, rainbow runner and flying fish which are caught by hand line and trolling are very efficient in attracting fish.

## 12. References

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2. Trolling for Small-scale Fisher (2010, Fisheries Training and Extension Centre (FiTEC) / OFCF, R. Morimitsu, Republic of Mauritius)
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