

SEA CUCUMBER FISHERIES, UTILIZATION AND TRADE IN BRUNEI DARUSSALAM

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1. Introduction

Brunei Darussalam has a total marine territorial area of about 38,600 km³ covering within the 200 nautical miles of Brunei Fishery Limits. The bottom physical feature of the Brunei Darussalam's water includes a narrow continental shelf having the total area of about 8,600 km² followed by sharp decline in the continental slope that extends to a deep trench with over 1000m in depth. It has estimated potential fishery resources at Maximum Sustainable Yild (MSY) of 21,300 mt with the value of about B\$112 million.

In this study, the data and information of the sea cucumber are based on the landings by 2 (two)

licensed boats using hooks, traps and long line that are operating within 3 to 20 nautical miles from the shore, also known as fishing zone 2, which mainly caught coral fish, lobsters as well as sea cucumbers. The trade statistics which revealed imports of sea cucumber, mainly processed products, are extracted from the Brunei Darussalam's External Trade Statistics and direct interviews with the fishermen, traders as well as the seafood consumers.


2. Taxonomic Information

There are eight types of sea cucumbers found in Brunei Darussalam waters based on the reported landings and assessment surveys conducted early on by the Department of Fisheries (**Table 1**).





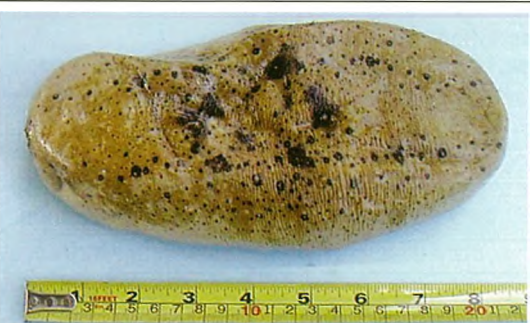
Table 1: Species of Sea Cucumber in Brunei Darussalam

Species Name	Family Name	Local Name	Gate Price (Wet)	Seling Price (Dried)
<i>Actinopyga miliaris</i>	HOLOTHURIIDAE	TIMUN LAUT TIMPO	B\$2.50/piece	B\$60.00/kg
<i>Holothuria atra</i>	HOLOTHURIIDAE	TIMUN LAUT TIGER	B\$1.00/piece	B\$ 30.00/kg
<i>Holothuria edulis</i>	HOLOTHURIIDAE	TIMUN LAUT KASUT	B\$0.50/pice	B\$10.00/kg
<i>Holothuria impatiens</i>	HOLOTHURIIDAE	TIMUN LAUT	NA	NA
<i>Holothuria martensii</i>	HOLOTHURIIDAE	TIMUN LAUT	NA	NA
<i>Holothuria rigida</i>	HOLOTHURIIDAE	TIMUN LAUT SUSU	B\$10.00/piece	B\$80.00/kg
<i>Holothuria sp.</i>	HOLOTHURIIDAE	TIMUN LAUT BAKUNGAN	B\$2.50/piece	B\$60.00/kg
<i>Thekenota ananas</i>	HOLOTHURIIDAE	TIMUN LAUT TALIPAN	B\$1.00/piece	B\$35.00/kg


Table 2: Biology of Sea Cucumbers in Brunei Darussalam

FAMILY: HOLOTHURIIDAE	
<p>Scientific Name: <i>Actinopyga miliaris</i> Common Name: Sea cucumber Local Name: TIMUN LAUT TIMPO</p> <p>Description: Black, tegument smooth with small scattered soft papillae; spicules include only small rods. Reefs and coastal waters.</p>	

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<p>FAMILY: HOLOTHURIIDAE</p> <p>Scientific Name: <i>Holothuria (Holodeima) atra</i></p> <p>Common Name: Sea cucumber</p> <p>Local Name: TIMUN LAUT TIGER</p> <p>Description: Black with black tentacles, but frequently covered with sand, small to very large, fissiparous, cylindrical with rounded ends, tegument smooth, body wall pliable, toxic red fluid released from skin on rubbing; spicules tables with reduced disc on moderate spire bearing a 'Maltese Cross' and rosettes but no buttons. Small specimens tend to have thin coating of sand with open patches of black skin showing through, large specimens are seen either with no sand covering or with a thick unbroken covering above. Animals are conspicuous and common lying exposed on sand flats of reef and coast.</p>	
<p>Scientific Name: <i>Holothuria (Halodeima) edulis</i></p> <p>Common Name: Sea cucumber</p> <p>Local Name: TIMUN LAUT KASUT</p> <p>Description: Dark red/black above pink below, small to large, cylindrical with rounded ends, tegument smooth, body wall pliable: spicules with tables and smaller disc than in atra. Reef exposed or concealed amongst rubble</p>	
<p>Scientific Name: <i>Holothuria (Thymiosyca) impatiens</i></p> <p>Common Name: Sea cucumber</p> <p>Local Name: TIMUN LAUT</p> <p>Description: Variegated pinks and browns with variable dark and light bands of transverse color are the most common patterns from reef animals, small to large cylindrical, tegument tough, papillae prominent, body firm but pliable, cuvierian tubules sometimes ejected: spicules well developed square tables and smooth buttons. Reefs, below rocks of reef flat.</p>	
<p>Scientific Name: <i>Holothuria (Metriatyla) martensii</i></p> <p>Common Name: Sea cucumber</p> <p>Local Name: TIMUN LAUT</p> <p>Description: Grey/brown with double row of dark spots on upper surface, small, flattened, teguments rough, thin white cuvierian tubules: spicules tables extended to track-like bodies with 7 ridges. Coastal, trawled or from silty foreshores</p>	
<p>Scientific Name: <i>Holothuria (Cystipus) rigida</i></p> <p>Common Name: Sea cucumber</p> <p>Local Name: TIMUN LAUT SUSU</p> <p>Description: White to grey, often covered with sand, with double row of dark spots along upper surface and lateral row of blunt papillae on each side, stout flattened and rigid, 20 spicules; spicules low tables, fenestrated spheres and knobbed buttons. Reef flat, below rocks</p>	

Scientific Name: <i>Holothuria</i> sp.	No sample available.
Common Name: Sea cucumber	
Local Name: TIMUN LAUT BAKUNGAN	
Description: NA	

FAMILY: STICHOPODIDAE	
Scientific Name: <i>Thelenota ananas</i>	
Common Name: Sea cucumber	
Local Name: TIMUN LAUT TALIPAN	
Description: Grey, orange, red often with a purple cast, very large (to 600 mm), square in cross section with prominent 'cockscomb' papillae over upper surface of thick but pliable body, tegument smooth; spicules delicate dichotomously branched rods without lateral spines. Reefs, exposed on rubble	

3. Production and Utilization

3.1 Production

Currently there are no fisheries specifically targeting sea cucumber in Brunei Darussalam. However, the Department of Fisheries has issued 2 licenses for catching sea cucumber and lobsters through diving since 1993 and to date they are still in operation. No specific gear is used to harvest the sea cucumber. They are collected manually and delivered to the land based mini factory. The sea cucumber are then boiled for many hours and the skin are peeled off to make the appearance more presentable in the market and soaked in the water, before being delivered to the local restaurants (mostly seafood restaurants) and some supermarkets. Some of the sea cucumbers are further processed into dried salted products for local and export markets. Table 3 indicates the landing of the sea cucumber from 1993 to 2006:-

Table 3: Annual Landings of sea cucumber from 1993 to 2006 in Brunei Darussalam

Year	Landing (Kg)
1993	64
1994	NA
1995	NA
1996	386
1997	NA
1998	25
1999	46
2000	36
2001	NA
2002	446
2003	212
2004	1,295
2005	1,463
2006	193

Source: Department of Fisheries, Ministry of Industry and Primary Resources

Note: NA – Data not available

The landings fluctuated greatly over the years and the highest catch was recorded in 2005 with the total weight of 1,463 kgs. The landing data are generally recorded under local and generic names of mixed sea cucumbers, hence it was difficult to identify and segregate the species by landings and value.

3.2 Marketing

The harvested sea cucumbers are sold in wet form in supermarkets as well as in the restaurants but not in the wet fish market due to the low demand for sea cucumbers. The price varies depending on the product form and type of the species sold. The price of sea cucumber in the wet form ranged from B\$ 0.50 to B\$ 2.50 per piece or B\$ 2.50 to B\$ 12.50/kg. The price in dried form offer better selling price in the range of B\$ 10.00 to B\$ 80.00 per kg depending on the species. There are about 3 to 5 pieces of sea cucumber per kg of some species. Hence, the producers prefer to process sea cucumbers into dried products as they fetch better price than in the wet or boiled product.

In Brunei Darussalam, the consumption of the sea cucumber is not that popular among local Malays unlike the Chinese who consider this as one of the rich delicacy in their food menu as well as for medicinal purposes. However the local Malays only utilize the extracts of sea cucumber oil for medicinal and cosmetic purposes. These sea cucumber oil extracts are imported and are available in local groceries, shops as well as in big stores. **Table 4** indicates the consumption and marketing of sea cucumbers in Brunei Darussalam.

Table 4. Consumption and Marketing of Sea Cucumbers in Brunei Darussalam

Sea Cucumber Species	Family Name	Product Form	Locally consumed (C); Discarded (D); Traded (T)	Market Destination
<i>Holothuria rigida</i>	HOLOTHURIIDAE	Fresh	(C)	Supermarket, seafood restaurants
<i>Holothuria atra</i>	HOLOTHURIIDAE	Fresh	(C)	seafood restaurants
<i>Thelenota ananas</i>	HOLOTHURIIDAE	Fresh and wet	(T)	Export to Sabah, Malaysia
<i>Actinophyga miliaris</i>	HOLOTHURIIDAE	Fresh and wet	(T)	Export to Sabah, Malaysia

Table 5. Exports by Year and Country Destination

Year	Qty (Kg)	Price/Kg	Total Value B\$	Country Destination
2003	120	\$ 45.00	\$ 5,400	Philippines
2004	64	\$ 25.00	\$ 1,600	Philippines
2005	1,088	\$ 5.62	\$ 6,121	Sabah and Sarawak(Miri)
2006	1,000	\$ 4.20	\$ 4,200	Sabah
2007 (Jan-Aug)	400	\$ 4.50	\$ 1,800	Sabah

4. Trade

4.1 Export

Due to the low demand of sea cucumbers, the excess quantities are exported to Malaysia (Sabah and Sarawak) and the Philippines as indicated in **Table 5**. Most export products are in wet and dried form.

4.2 Import

Early on, imported sea cucumber products are categorized under 'other mollusk' including aquatic invertebrates frozen, dried, salted or in brine. Hence, the statistics may not be the actual quantity of sea cucumber products imported into Brunei. The amount of imported sea cucumber is generally small and the import figures may be bloated with a combination of other mollusk products under this category. It was found that the data has been improved in 2005 when the actual imported sea cucumber was recorded in one category as (trepan) dried, salted or in brine. Most sea cucumber products were imported from Singapore. **Table 6** indicates the imports of aquatic invertebrates frozen, dried, salted or in brine including sea cucumber.

Table 6. Imports from 2000-2005

Year	Quantity (metric tons)	Total Value (B\$)
2000	16	\$ 492,842
2001	NA	-
2002	21	\$ 144,878
2003	21	\$ 179,814
2004	NA	-
2005	5	\$ 7,966

5. Conclusions and Recommendations

5.1 Conclusions

Sea cucumber is not a primary targeted species in Brunei Darussalam and the demand of this species is minimal. The biological information on sea cucumber and related habitats is still lacking which includes among others:

- Lack of biological data on sea cucumber such as length and weight, sex, maturity, behavior and life cycle
- Lack of data on the temporal and spatial distribution of sea cucumbers as well as lack of assessment studies on the status of its habitat and the impact of various fishing activities
- Lack of proper species identification especially when reported only as sea cucumber in log books and data sheets;
- Lack of information or records on the utilization, handling, post harvest and marketing of sea cucumber particularly to the species level

5.2 Recommendations

The following are the recommendations in improving this study and to ultimately in supporting the conservation and management of sea cucumber and their long term sustainable use under the comprehensive national fisheries management policy, plan and program.

5.2.1 Improvement of fisheries statistics and monitoring system.

This includes improvement in the database system that will help improve in the storage, retrieval and analysis of the fisheries statistical in general;

5.2.2 Strengthen data collection and analysis.

5.2.2.1 Strengthening the technical survey to map out the spatial and seasonal distribution of the sea cucumber that will include the identification of habitats for breeding and nursery grounds;

5.2.2.2 Gather ecological information on sea cucumber to assess the general health of the environment and critical habitats where these species are found;

5.2.2.3 Conduct the comprehensive study on the utilization, processing, handling, marketing and trade of sea cucumber;

5.2.3 Research

5.2.3.1 Facilitate and encourage research on little known sea cucumber species that are of known commercial value. Some species are not reported properly and their identifications are not properly established, therefore a close attention must be given on other species that are not commonly caught by fishers;

5.2.3.2 Promote research activities to maximize the utilization of sea cucumber that also address the issues on how to improve the quality and value of the product to tap potential export market especially for the medicinal purposes;

5.2.4 Strengthening the capacity building especially in the area of taxonomy and biology of the sea cucumber. This also includes promoting the close coordination with other local and overseas institutions and agencies regarding the research and capacity building.

5.2.5 Promoting awareness on the sea cucumber resource management among the stakeholders and public. The Department of Fisheries is gearing to promote awareness on marine life especially among the youth and one way to do this is through the establishment of marine parks and marine aquaria. This set up will also serve as center for research in conservation and management of marine ecosystem and at the same time educating the general public through awareness programs. It is also emphasized to monitor and ensure that no destructive fishing gears is used in Brunei Darussalam Waters especially the use of cyanide and blast fishing methods which may result in the destruction of coral reefs, which are the main breeding and nursery grounds for most fishes including sea cucumbers.