

Distribution of economic returns from fishers to exporters: A case study from the sea cucumber fishing industry in the north and northwest coasts of Sri Lanka



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INTRODUCTION

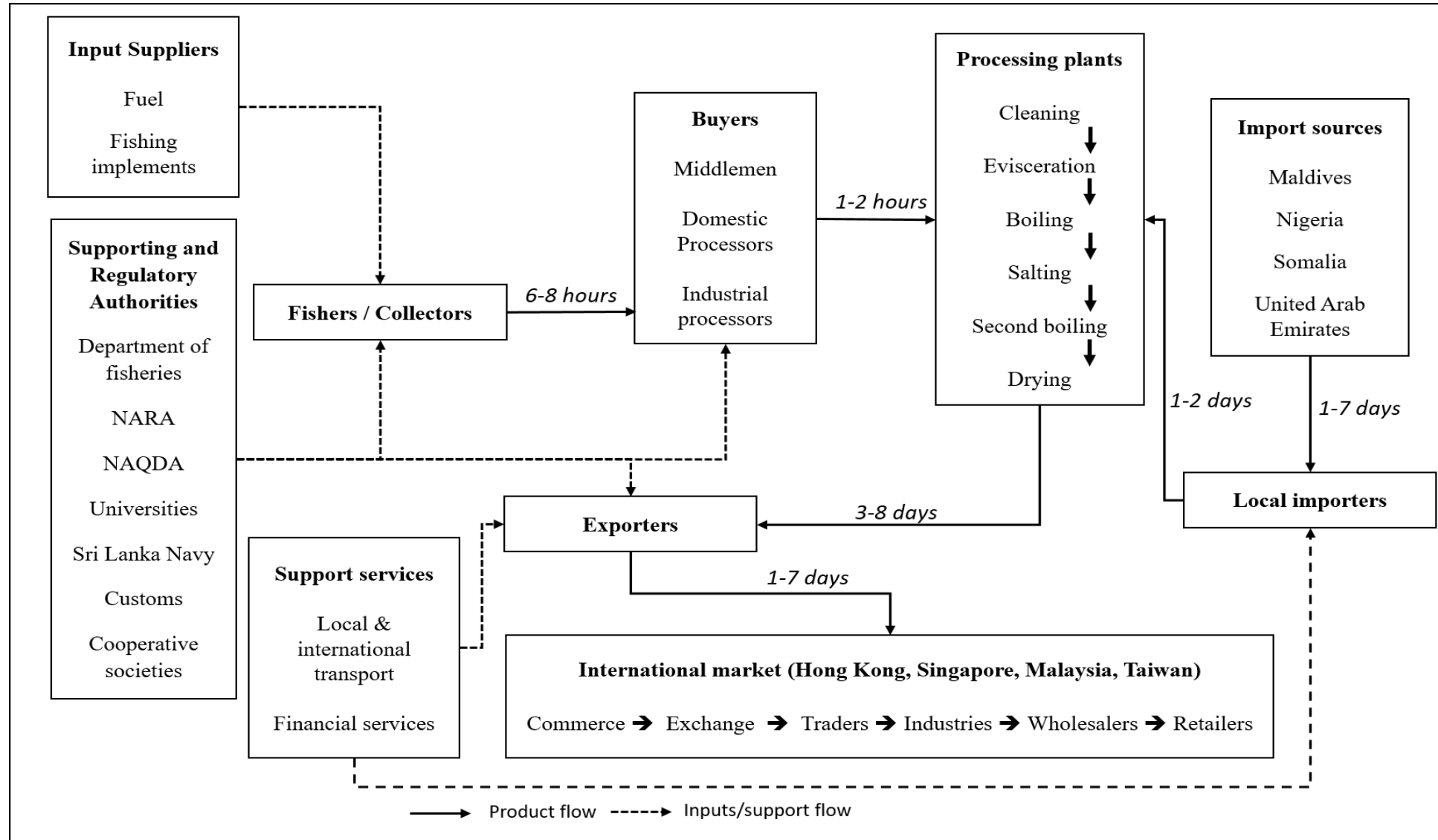
- Catching of sea cucumbers is one of the oldest activities of commercial fisheries in Asian and Pacific countries
- Introduced by Chinese in late 1800's to Sri Lanka
- Practiced for several centuries
- Confined to the north, east, northeast and northwest coasts
- 21 sea cucumber species are commercially exploited in the coastal waters of Sri Lanka



- No tradition of consuming sea cucumbers in Sri Lanka
- Entire harvest is processed as *bêche-de-mer* and exported to
 - ✓ Singapore
 - ✓ Taiwan ~ 250 Mt US\$ 11 million
 - ✓ China
- This fishery provides a significant contribution to socioeconomic and well-being of small-scale coastal fishers in the northern Sri Lanka



- *Bêche-de-mer* production chain involves several stake holders



Evaluate the distribution of economic returns among key players

METHODOLOGY – DATA COLLECTION

- Data were collected from November 2015 to January 2017 in the north and northwest coasts of Sri Lanka
- Following approaches were carried to collect data
 - ✓ Field Observations
 - ✓ Questionnaires
 - ✓ Semi-structured interviews
 - ✓ Focus group discussions
- Respondents were initially identified visiting sea cucumber landing & processing sites
- Processors : People engage in sea cucumber processing
- Middlemen : Pass the products to upward links without any processing












Data were collected from

- ✓ Fishers - 167
- ✓ Processors - 16
- ✓ Exporters - 07

- Several pre-trials were done before finalizing the questionnaires
- Responses were recorded using a voice recorder with their permission
- Descriptive statistics were used to analyze the socio-economic characteristics of fishers, processors and traders.
- Price markup over the value chain of nine commercial sea cucumber was determined and compared using Analysis of Variance (ANOVA).
- Level of satisfaction of fishers on their buyers was measured on a five-point hedonic scale (0- Highly dissatisfied and 4-Highly satisfied).
- Ordinal regression was used to examine the relationships

RESULTS

- **Nine (9)** sea cucumber species are dominant in the catches
- All are landed in the fresh form and sold as pieces at the landing sites

No	Species		No	Species	
1	<i>Holothuria scabra</i>		6	<i>Bohadschia vitiensis</i>	
2	<i>Holothuria spinifera</i>		7	<i>Thelenota anax</i>	
3	<i>Holothuria atra</i>		8	<i>Stichopus chloronotus</i>	
4	<i>Bohadschia marmorata</i>		9	<i>Stichopus naso</i>	
5	<i>Bohadschia sp. 1</i>				

- ✓ The sea cucumber value chain consists of
 - ~1200 of fishers
 - 48 processors and intermediate buyers
 - 8 exporters
 - 3-5 international buyers
- ✓ Fishermen play a dominant role in fishing (96%), processing (98%) and marketing (100%)
- ✓ Limited opportunities for fisherwomen

- Fishers mainly use 3 methods to collect sea cucumbers

- Diving (96%)

- Netting (2%)

- Gleaning (2%)

- 1. SCUBA Diving (92%)**

- ✓ Primary method

- ✓ Entirely done by fishermen

- ✓ Age range : 18-58 years

- ✓ Target all 9 species



2. Snorkeling (4%)

✓ Entirely done by fishermen

✓ Mainly targets

- *Holothuria scabra*
- *Holothuria spinifera*
- *Holothuria atra*
- *Stichopus naso*



3. Gleaning (2%)

- ✓ Confined only to northern fishing region
- ✓ Entirely done by fisherwomen
 - 66.7% : wives of sea cucumber divers
 - 33.3%: widows who lost their husbands during the civil war period
- ✓ *H. scabra* is the main target
- ✓ Women are in the age range of 18-60



4. Netting (2%)

- ✓ Around 28 surrounding nets are operated
- ✓ 4 fishers involve in each net operation.
- ✓ They fix the surrounding net at around 17.00-18.00 hours and haul it back next day morning 6.00-8.00 hours.
- ✓ *S. naso* is the main target of net fishes.
- ✓ External damages due to netting is the main disadvantage of this method

Fishery and Socio-economic Information

Parameter	SCUBA	SNOKELING	GLEANNING	NETTING
Crew members	2 – 3	5 – 7	1	3-4
Number of people / per day	868±64	55±51	27±4	28±4
Average daily collection (ind.)	290±10	37±22	2±1	35±4
Fishing time	Day Night	Day	Day	Day
Distance to fishing ground (km)	10±3	8±4	2±1	16± 1
Average monthly income US\$	516.4±222.4	249.9±190.25	50.00±20.50	107.50±18.6
Cost per person (US\$) per day	8.9±8.0	2.9±1.7	0.08±0.00	6.5±1.9

2. Sea cucumber Processing



Grading



Degutting



Boiling



Salting



Drying

Socio-demographic characteristics of sea cucumber fishers, processors and exporters

Fishing regions	Total respondents	% Males	Average Age (in Years)	Age Range (in Years)	Average Experience (in Years)
Northwest					
Fishers	84	100.0	40.68±9.69	25-67	15.88±9.98
Middlemen	2	100.0	49.0±8.52	42-61	13.25±5.38
Processors	7	100.0	30.0±7.12	23-45	13.71±7.04
North					
Fishers	83	86.96	41.48±10.68	24-63	18.35±12.82
Middlemen	2	100.0	57.5±28.99	37-78	2.5±0.71
Processors	9	100.0	40.17±15.02	22-58	15.17±11.82
Exporters	7	100.0	45.43±14.73	29-66	21.43±13.91

- Women involve in processing (~ 50)
- They are in 18 – 45 years age range
- 12% are just school leavers; mainly involve for removal of chalky materials
- Call by processors when their service is needed
- Payment depends on the service

1. Grading and evisceration

- ✓ 1.00 LKR (0.01 US\$) per individual
- ✓ 2000 to 3000 individuals per day
- ✓ Average monthly 35,000 LKR (225 US\$)



2. Boiling

- ✓ Pay for daily basis
- ✓ 900 LKR (6 US\$) per day + meal
- ✓ Average monthly 15,000 LKR (100 US\$)

3. Removal of Chalky Materials

- ✓ Pay for daily basis
- ✓ 800 LKR (5 US\$) per day + meal
- ✓ Average monthly 12,000 LKR (78 US\$)

○ Majority of women (62%) are not happy

- ✓ Very low income
- ✓ No job security
- ✓ Lack of proper training



Price markup for nine commercial species

Species	No. of sea cucumbers per Kg	Income (US\$ per kg)		
		Fishers (USD)	Processors	Exporters
<i>Holothuria scabra</i>	15	117.46±20.65 ^a	129.95±12.03 ^a	240.86±1.86 ^b
<i>Holothuria spinifera</i>	30	45.96±2.99 ^a	82.79±10.54 ^b	105.65±20.29 ^c
<i>Thelenota anax</i>	20	40.86±3.23 ^a	86.02±7.45 ^b	140.86±4.93 ^c
<i>Stichopus chloronotus</i>	40	16.07±1.21 ^a	67.74±20.06 ^b	94.62±3.72 ^c
<i>Holothuria atra</i>	40	15.05±4.58 ^a	17.2±9.86 ^a	38.71±5.27 ^b
<i>Bohadschia marmorata</i>	20	37.88±6.31 ^a	44.09±1.86 ^a	54.84±3.23 ^b
<i>Bohadschia sp. 1</i>	20	32.04±3.96 ^a	38.71±6.45 ^b	53.76±1.86 ^c
<i>Bohadschia vitiensis</i>	35	16.94±5.1 ^a	26.88±4.93 ^b	30.65±4.27 ^b
<i>Stichopus naso</i>	120	29.56±3.13 ^a	33.33±10.37 ^a	50.53±4.93 ^b

- ✓ A significant difference of the sale price from fishers to exporters ($p < 0.05$, ANOVA).
- ✓ *S. chloronotus* reported the highest price markup from fisher to exporter (5.89 times) and *B. marmorata* reported the lowest (1.45 times)
- ✓ Fishers received the highest economic return when they sell high-value *H. scabra* to the processors (90.39%); processor received 54% of end market value.
- ✓ Average proportionate return to fishers
 - ✓ Medium-value species - 47.3%
 - ✓ Low-value specie - 38.9- 69.1%
- ✓ Discrepancies in income distribution are mainly due to lack of
 - ✓ Price transparency
 - ✓ Proper handling and processing
 - ✓ Bargaining power
 - ✓ Proper understanding of the current market structure

Exporters earn significantly higher price than the fishers ($p < 0.05$; ANOVA) though they bear relatively small cost for running the business.

Satisfaction of fisher's towards their buyers

- ✓ Both SCUBA divers (4.57 ± 1.86) and breath hold divers (4.75 ± 1.46) positively satisfied with their buyers ($p < 0.05$)
- ✓ Net fishers showed a negative satisfaction.
- ✓ Fisher's level of satisfaction towards their buyers increases when their annual earning is increasing (0.65 ± 0.21 , Ordinal regression, $p < 0.05$).
- ✓ Most of the players in production chain have high satisfaction (68%) of their occupation
- ✓ High confidence that the sea cucumber fishery makes a significant contribution for their livelihood and well-being

CONCLUSIONS

- High risk occupation but provides significant contribution to livelihood and well-being of the fishing community
- Significant difference of the sale price from fishers to exporters but most are satisfied
- Some possible solutions to overcome the inequality of income distribution
 - ✓ Proper training on processing and postharvest practices
 - ✓ increasing the governance and bargaining power of fishers
 - ✓ setting minimum price limits for fresh and processed sea cucumber species

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