



MARKETING OF SHARKS AND RAYS IN SABAH AND INTERNATIONAL TRADE OF MALAYSIA'S SHARKS AND RAYS

Fatimah Mohamed Arshad
Kusairi Mohd Noh
Tai Shzee Yew
Ahmad Shuib
Ahmad Ali
Nurhafizah Mohamed
Aswani Farhana Mohd Noh
Allia Farhana Rosmanshah

INSTITUT SUMBER MARIN ASIA TENGGARA

2017



Marketing of Sharks and Rays in Sabah and International Trade of Malaysia's Sharks and Rays

Fatimah Mohamed Arshad
Kusairi Mohd Noh
Tai Shzee Yew
Ahmad Shuib

Nurhafizah Mohamed
Aswani Farhana Mohd Noh
Allia Farhana Rosmanshah
*(Institute of Agricultural and Food Policy Studies
Universiti Putra Malaysia)*

Ahmad Ali
(SEAFDEC/MFRDMD)

Institute of Agricultural and Food Policy Studies
Universiti Putra Malaysia
Serdang 43400 Selangor
Malaysia
2017

Copyright© 2017 Department of Fisheries Malaysia

All Right Reserved.

This publication may be reproduced for educational and other non-commercial purposes without permission of the copyright holder, provided the source is cited and the copyright holder receives a copy of the reproduce material. Reproduce for commercial purposes is prohibited without prior written permission of the copyright holder.

TABLE OF CONTENTS

ABBREVIATION	vi
FOREWORD	vii
1. Introduction	1
2. Problem Statement	1
3. Objectives of the Study	1
4. Methodology	2
4.1 Data on Domestic Marketing of Sharks and Rays	2
4.2 Data Description	3
4.2.1 Trade Data	3
4.3 Competitiveness of Sharks and Rays Export	5
5. Trade	7
5.1 World Market.....	7
5.2 ASEAN Market	18
5.3 Malaysian Market	31
5.4 Malaysia's Export Competitiveness: Multifactor Partitioning Analysis	43
5.5 Competitiveness: Relative Trade Advantage	45
5.6 Summary	47
6. Marketing of Shark and Ray Products	48
6.1 Case 1: Marketing Channels of Sharks in Kota Kinabalu, Sabah as at 14 September 2015	49
6.2 52	
6.2 Case 2 (Part 2): Sharks Marketing Channel in Sandakan, Sabah as of 17 September 2015	54
6.3 Case 3: Sharks and Ray Marketing Channel of Company A, Sandakan, Sabah as 17 September 2015	55
6.4 Case 4: Marketing Channel of Rays of Company B in Tawau, Sabah as of 21 September 2015	57
6.5 Case 5: Marketing Channel of Sharks of Company C, Semporna, Sabah as of 19 September 2015	59
6.6 Summary	60
7. Conclusion	61
REFERENCE	64
Appendix I: List of Stakeholders and Activities	66
Appendix II: Proforma for Focus Group Discussion on Marketing of Sharks	68
Appendix III: From Shift Share to Multifactor Partitioning	69
Appendix IV: Revealed Trade Advantage.....	73

LIST OF TABLES

Table 1: Malaysia's Sharks and Rays Commodities Recorded by FAO	4
Table 2: Malaysia's Sharks and Rays Commodities Recorded by DOFM, 2007-2013	4
Table 3: Export Data for Sharks and Rays Commodities Recorded by FAO, Selected Countries, 2011	6
Table 4: The World Export Quantity of Shark and Ray Products (mt), 1990-2011	8
Table 5: World Import of Sharks and Rays (mt), 1990-2011	12
Table 6: World Export of Shark Fin by Region (mt), 1990-2011	14
Table 7: World Import of Shark Fin by Region (mt), 1990-2011	14
Table 8: World Export of Shark Meat by Region (mt), 1990-2011	16
Table 9: World Import of Shark Meat (mt), 1990-2011	17
Table 10: ASEAN Export Quantity of Shark and Ray Products (mt), 1990-2011	19
Table 11: ASEAN Export Quantity of Sharks and Rays (%) by Country and Category	21
Table 12: ASEAN Export of Sharks and Rays by Country (%), 1990-2011	23
Table 13: ASEAN Import of Sharks and Rays (mt)	23
Table 14: ASEAN Import of Sharks and Rays by Country and Category, 1990-2011	25
Table 15: ASEAN Import by Country (%), 1990-2016	27
Table 16: ASEAN Export of Shark Fin by Country (mt), 1990-2011.....	29
Table 17: ASEAN Import of Shark Fin (mt), 1990-2011	30
Table 18: ASEAN Export of Shark Meat by Country (mt), 1990-2011	30
Table 19: ASEAN Import of Shark Meat by Country (mt), 1990-2011	31
Table 20: Malaysia's Export of Sharks and Rays (mt), 2004 - 2014	34
Table 21: Table Malaysia's Export of Sharks and Rays (RM), 2004 - 2014	35
Table 22: Malaysia's Export of Shark and Ray Products, by Selected Destinations (mt), 2005-2014	38
Table 23: Malaysia's Import of Sharks and Rays (mt), 2004-2014	39
Table 24: Malaysia's Import of Sharks (RM) 2004- 2014	40
Table 25: Malaysia's Import Shark and Ray Products, by Selected Source of Origins (mt), 2005-2014	42
Table 26: Partitioned Rates of Growth of Export by Commodity (%), 2009/2010	43
Table 27: Partitioned Actual Growth of Export by Commodity ('000 USD), 2009/2010	43
Table 28: Partitioned Rates of Growth of Export by Commodity (%), 2010/2011	44
Table 29: Partitioned Actual Growth of Export by Commodity ('000 USD), 2010/2011	44
Table 30: Industry Growth of Export by Country ('000 USD), 2010/2010	44
Table 31: Revealed Trade Advantage Index of Selected Countries, 2009-2011	45

LIST OF FIGURES

Figure 1: World Export of Sharks (mt), 1976-2011	7
Figure 2: Total Export Quantity of Shark and Ray Products (mt), the World and ASEAN, 1990-2011	9
Figure 3: Contribution of ASEAN to the World Export by Commodity, 1990-2011 (%)	10
Figure 4: World Largest Exporters of Sharks and Rays (%), 2011	10
Figure 5: World Sharks and Rays Import (mt), 1990-2011	11
Figure 6: World Import of Sharks and Rays by Commodity Type (mt), 1976-2011	13
Figure 7: World Largest Importers of Sharks and Rays (%), 2011	13
Figure 8: World Largest Exporters of Shark Fin (%), 2011	15
Figure 9: World Largest Importer of Shark Fin (%), 2011	16
Figure 10: World Largest Exporter of Shark Meat (%), 2011	17
Figure 11: World Largest Importer of Shark Meat (%), 2011	18
Figure 12: ASEAN Export Quantity Shark and Ray Products (mt), 1976-2011	18

Figure 13:	Composition of ASEAN Exports of Sharks and Rays (%), 1990 - 2011	19
Figure 14:	Figure ASEAN Import Composition (%)	24
Figure 15:	ASEAN Import by Country (%), 1990- 2011	27
Figure 16:	ASEAN Import of Sharks and Rays (mt), 1976-201i	28
Figure 17:	ASEAN Export of Shark Fin by Country (%), 1990-2011	29
Figure 18:	ASEAN Import of Shark Fin by Country (mt), 1990-2011	30
Figure 19:	ASEAN Import of Shark Fin by Country (mt), 1990-2011	31
Figure 20:	Malaysian Export, Import and Deficit of Sharks and Rays Trade (RM mn), 2005-2012	32
Figure 21:	Malaysian Export, Import and Deficit of Sharks and Rays Trade (RM mn), 2005-2012	32
Figure 22:	Malaysia's Export Composition (%) 2004-2014	36
Figure 23:	Average unit value of export price (RM/mt), 2004 - 2012	37
Figure 24:	Malaysia's Import Composition of Shark and Ray Products (%), 2004-2012	41
Figure 25:	Sharks Marketing Channel in Sabah, Malaysia	48
Figure 26:	Case 1: Marketing Channels of Sharks in Kota Kinabalu, Sabah as at 14 September 2015	51
Figure 27:	Case 2 (Part 1): Rays Marketing Channel in Sandakan, Sabah as of 17 September 2015	53
Figure 28:	Case 2 (Part 2): Sharks Marketing Channel in Sandakan, Sabah as of 17 September 2015	54
Figure 29:	Case 3: Sharks and Ray Marketing Channel of Company A, Sandakan, Sabah as 17 September 2015	56
Figure 30:	Rays Case 4 Marketing Channel of Rays of Company B in Tawau, Sabah as at 21 September 2015	58
Figure 31:	Case 5: Shark Marketing Channel in Semporna, Sabah as 19 September 2015.....	59

ABBREVIATION

ASEAN	Association of Southeast Asian Nations
DOFM	Department of Fisheries Malaysia
DOFS	Department of Fisheries Sabah
FGD	Focus Group Discussions
FAO	Food and Agriculture Organization of the United Nations
FishStatJ	Name of software for Fisheries Statistical Time Series of FAO
HS	Harmonized System
IPOA - Shark	International Plan of Action for Conservation and Management of Shark
ISSCAAP	International Standard Statistical Classification of Aquatic Animals and Plants
KIS	Key Informant Surveys
LKIM	Lembaga Kemajuan Ikan Malaysia (Fisheries Development Authority of Malaysia)
mt	Metric Tonnes
MFP	Multifactor Partitioning
MFRDMD	Marine Fishery Resources Development and Management Department
NPOA	National Plan of Action
RTA	Relative Trade Advantage
RXA	Revealed Export Advantage
SAFMA	Sabah Fish Marketing Authority
SEAFDEC	Southeast Asian Fisheries Development Center
SSA	Shift Share Analysis
SITC	Standard International Trade Classification
SEAFEST	Name of a jetty in Semporna, Sabah
UAE	United Arab Emirates

FOREWORD

This study seeks to understand the domestic marketing of sharks and rays in Sabah as well as the international trade of Malaysia's shark and ray products. It is intended to complement another study titled "The Socio-economic and dependency of fishers on sharks and rays in Sabah" carried out by the Institute of Agricultural and Food Policy Studies in collaboration with Marine Fishery Resources Development and Management Department, Southeast Asian Fisheries Development Center (SEAFDEC/MFRDMD). The findings of these studies are useful to serve as an essential basis for developing appropriate fisheries management policies and actions, and thereby promote national responsibility for sharks and rays resource management issues.

The study team would like to record their sincere thanks to the DOFM for initiating this study. The helps and collaborations from agencies and individuals were crucial in making this study achieved its intended objectives. In particular, we are indebted to the officers of DOFM and Lembaga Kemajuan Ikan Malaysia-LKIM (Fisheries Development Authority of Malaysia) for their continuous support to the study. The ever willingness of the officials of the Department of Fisheries Sabah (DOFS) at Kota Kinabalu, Sandakan, Tawau, and Semporna to facilitate our studies either in terms of information or leads is highly appreciated. Without their support, it can be safely said this study would have not been able to implement the field surveys and visits to landing centres and discussions with the fishers and industry participants, who are the targeted stakeholders of the study. Their input serve as the core data for the study.

The support of the Universiti Putra Malaysia particularly the Institute of Agricultural and Food Policy Studies is highly appreciated. The hard work and contribution of Sahra Mohamadi with data analysis is commendable indeed. We thank Illisriyani Ismail for the data sourcing, preparation and editing of the draft. Also not to forget Roba'a Yusuf for the involvement of editing the draft.

Finally, we would like to thank the DOFM for sponsoring this project in 2015 to 2016. This pioneer study in Sabah has explored the status and trends of sharks and rays utilisation, marketing and trade which had not been documented before. The findings from this study will be useful as a guideline in expanding similar study to other states in Malaysia.

However, it was the readiness and warmness of the fishers in selected areas in Kota Kinabalu, Sandakan, Tawau, and Semporna to share with us their experiences, insights and information that touched us deep with appreciation and admiration. Despite their struggle to earn a good income, their respect to the ocean and its content is remarkable that deserve respect and appreciation. This report is dedicated to them.

1. Introduction

This document provides the findings on a study of the utilisation, marketing and trade of sharks and rays in Malaysia focusing Sabah. The report is organized as follows: (i) The first section provides the problem statement and objectives of the study; (ii) the second section entails a brief description of the methodology which covers data source and empirical methods used; (iii) the third section discusses the findings of the study with respect to sharks and rays utilisation and marketing, trade pattern, and competitiveness; and (iv) the last section concludes the study.

2. Problem Statement

Malaysia has developed a National Plan of Action for sharks (NPOA-Shark) in 2006 in line with the requirement of the International Plan of Action for Conservation and Management of Sharks (IPOA-Sharks) by FAO in 1998 (Department of Fisheries Malaysia, 2006). The NPOA-Shark contains seven major items. They are: biology and habitat, socio-economic aspects of fishers and middlemen, trade, consumption of elasmobranch, capacity building and research coordination, increasing awareness through information, conservation and effective management of sharks and rays. The first NPOA-Shark has been revised in 2014 taking into account of the suggestions made by the IPOA-Sharks after the document was evaluated on its achievement (Department of Fisheries Malaysia, 2014). According to IPOA-Sharks, all the seven items under NPOA-Shark 2006 have been addressed but sections on the socio-economics profile of the fishers and middlemen requires further empirical evidences as well as on trade issues. A number of studies have been proposed by Department of Fisheries Malaysia (DOFM) to fill the knowledge gap namely, (i) dependency of fishers in Sabah on shark and ray catch; (ii) domestic utilisation, marketing of sharks and rays in Sabah; and (iii) the international trade of the Malaysia's shark and ray products. This report provides the findings of the latter two themes.

The evidences on trade trends and competitiveness provide an indication of the extent of commercialization activities of this commodity in Malaysia in comparison to its trade partners in the ASEAN region. Profiling the middlemen, their marketing activities and practices are crucial to indicate the economic roles of each type middlemen along the supply chain and the value creation made on the products respectively. This information are indicators of the commodification and marketization of sharks and rays in Malaysia, the major players, value added activities, roles of prices on the supply and demand of shark and ray products and consumer preferences. They are valuable input towards designing a sustainable development of sharks and rays from all angles: production, utilisation, supply, demand, market and resource management.

3. Objectives of the Study

The overall objective of the study is to examine the domestic marketing of shark and ray products in Sabah and the international trade of Malaysia's sharks and rays. The sub-objectives are:

- i. To identify the major actors in the marketing of sharks and rays in selected areas of Sabah;
- ii. To examine the sharks marketing channels and practices in selected areas in Sabah;
- iii. To examine the shark trade pattern in Malaysia and ASEAN countries; and

iv. To assess the competitiveness of the Malaysian sharks export using shift share analysis, reveal trade advantage and multifactor partitioning method.

4. Methodology

The following section describes the methodologies applied to achieve the above objectives. The method for each objective is outlined below:

Objectives (i) and (ii): Supply chain analysis

Objective (iii): Descriptive analysis

Objective (iv): Multifactor partitioning and relative trade advantage

Descriptive analysis of trade patterns and competitiveness rely on secondary data sourced from the Food and Agriculture Organization (FAO) as well as from DOFM. Two indicators are estimated to gauge the competitiveness of sharks and rays exports of Malaysia namely “multifactor partitioning” and “relative trade advantage”. Marketing channel analysis and major marketing actors are identified using primary data collected from various middlemen in selected market centres in Sabah. A “focus group discussion” technique is used to solicit numerous data and information about their profile, marketing practices and activities. The list of stakeholders interviewed is provided in Appendix I.

The following discussion describes the data source and type as well as a brief discussion of the methods mentioned above.

4.1 Data on Domestic Marketing of Sharks and Rays

Data on the marketing of sharks and rays are collected through “key informant surveys” or KIS and “focus group discussions” or FGD with relevant stakeholders who are involved in the activities. KIS is a qualitative in-depth interview with individuals who know what is going on in the community¹. In this study, the purpose of KIS is to collect information from a wide range of individuals including community leaders, traders, officials, prominent fishers, village heads who have first-hand knowledge about the fisher community and market. A FGD is a small group of six to ten individuals led through an open discussion by a skilled moderator². The group is large enough to generate rich discussion but not so large enough that some participants are left out.

The stakeholders involved in both the KIS and FGD were: fishers, small time traders, wholesalers, processors, retailers (including restaurants, medicinal shops) and exporters. The study has selected landing centres in Sabah such as Kota Kinabalu which accounted for 18.6% of sharks landing in Sabah in 2013, Sandakan (29.1%), Tawau (3.2%) and Semporna (35.6%) (Department of Fisheries Sabah, 2014).

The proforma used in the interview of the stakeholders is provided in Appendix II. A supply chain framework is used to guide the discussion and information seeking. The study ensured that major marketing functions are covered. These include: exchange function (buying, selling and storage), physical (transportation, processing and standardization) and facilitating (risk bearing, financing and market intelligence). The major players along supply chain and product development are identified and observed respectively from the landing centres until they reach the final destinations reported by the stakeholders. To

1 http://healthpolicy.ucla.edu/programs/health-data/trainings/Documents/tw_cba23.pdf

2 https://assessment.trinity.duke.edu/documents/How_to_Conduct_a_Focus_Group.pdf

capture the differences in the marketing network between localities, a case study³ approach is adopted for the locality and specific firm chosen.

4.2 Data Description

4.2.1 Trade Data

The examination of the trade pattern and competitiveness rely on secondary data from FishStatJ Software, FAO report (2015) and Annual Fisheries Statistics, DOFM (2000-2014). The selected commodity group is International Standard Statistical Classification of Aquatic Animals and Plants (ISSCAAP) with sub-categories of sharks, rays, and chimaeras.

Table 1 presents the availability of trade data of sharks and rays recorded in the FAO dataset. For Malaysia, data is available for only three commodities namely; i) Shark fins, dried, salted, etc., ii) Shark fins, prepared or preserved, and iii) Sharks nei, frozen.

The second available data source is from DOFM with 14 years of time series data from 2000 to 2014. Shark products are categorized into six commodities and ray products into two commodities. Table 2 presents sharks and rays commodities and the SITC⁴ and HS⁵ codes from 2007 to 2013.

³ "Case study" is defined as an in-depth investigation of a single individual, group or event to explore the causes of underlying principles (<http://www.pressacademia.org/case-studies/definition-of-case-study>)

⁴ SITC - Standard International Trade Classification

⁵ HS - Harmonized System

Table 1: Malaysia's Sharks and Rays Commodities Recorded by FAO

No.	Commodity	MY
1	Catsharks, nursehounds, fresh or chilled	
2	Catsharks, nursehounds, frozen	
3	Dogfish (Squalidae) and catshark fillets, frozen	
4	Dogfish (Squalidae), fresh or chilled	
5	Dogfish (Squalidae), frozen	
6	Porbeagle shark (Lamnanasus), fillets, rozen	
7	Porbeagle shark (Lamnanasus), fresh or chilled	
8	Porbeagle shark (Lamnanasus), frozen	
9	Shark fillets nei, frozen	
10	Shark fillets, fresh or chilled	
11	Shark fins, dried, salted, etc.	/
12	Shark fins, dried, unsalted	
13	Shark fins, frozen	
14	Shark fins, prepared or preserved	/
15	Shark fins, salted and in brine but not dried or smoked	
16	Shark liver oil	
17	Shark oil	
18	Sharks nei, fresh or chilled	
19	Sharks nei, frozen	/
20	Sharks, dried, salted or in brine	
21	Sharks, rays, chimaeras nei, frozen	
22	Sharks, rays, etc., dried, salted or in brine	
23	Sharks, rays, skates, fresh or chilled, nei	
24	Sharks, rays, chimaeras, nei fillets fresh or chilled	
25	Sharks, rays, chimaeras, skates, nei fillets frozen	
26	Skates, fresh or chilled	
27	Skates, frozen	

Table 2: Malaysia's Sharks and Rays Commodities Recorded by DOFM, 2007-2013

No	Sharks			Year						
	SITC	HS	Description	07	08	09	10	11	12	13
1	034283000	030375000	Dogfish and other sharks, excluding livers and roes, frozen	/	/	/	/	/	/	/
2	035130300	030559300	Shark's fins, dried, whether or not salted but not smoked	/	/	/	/	/	/	/
3	035299200	030569200	Sharks' fins, salted but not dried or smoked and in brine	/	/	/	/	/	/	
4	037160010	160420001	Sharks' fins, prepared & ready for use, in airtight containers	/	/	/	/	/	/	/
5	037160910	160420910	Shark's fins	/	/	/	/	/	/	
	035130300	0305710000	Shark's fins							/
6	037169400	1604209910	Shark's fins, other than in Airtight Containers							/
7	034188200	030375000	Rays and Skates (Rajidae), excluding Livers and Roes, Fresh or Chilled							/
8	034288200	030559300	Rays and Skates (Rajidae), excluding Fish Fillets, Livers and Roes, Frozen							/

Source: DOFM (2015)

The categories of sharks change over time. In 2005, seven commodities were reported while only five commodities were reported between 2009 and 2012. In 2013, one more commodity has been added. As indicated in the table, data on ray commodities were only recorded on 2013. It is important to note that SITC and HS coding have been updated a few times throughout the period (2000-2013).

4.3 Competitiveness of Sharks and Rays Export

Competitiveness is defined as industry's ability to make profit and at the same time to maintain domestic market share and exports. In this definition, there are two types of relevant competitive measurement namely profit and market share. Most literatures used market share as a measure of expected profit (or proxy) and hence an indicator of competitiveness. The two popular and common indicators used to measure competitiveness are: Shift Share Analysis (SSA) and Relative Trade Advantage (RTA).

The shift share analysis seeks to explain the reasons why a country growth rates exceed or lag behind the regional average rate. One obvious explanation is the differences in industry mix among countries in the region. Secondly, it is due to the differences in the country's economic conditions as well as industrial structure. As economic conditions vary from country to country, it is expected that a country possessing certain economic advantages will experience higher rates of growth. Shift share analysis breaks down growth rates into three components to help understand what is driving the change. They are: national growth effect, industry mix effect and regional competitive effect.

National growth effect refers to the amount of growth or decline in an industry that could be attributed to the overall growth of the national economy. Industry mix effect refers to the amount of growth or decline in an industry that could be attributed to the performance of the specific industry at the national level. Regional competitive effect is defined as the amount of growth or decline in a specific industry that could be attributed to a local advantage or disadvantage.

However this technique has its own flaws which render it inadequate to measure competitiveness. Some of the flaws cited include; the unreasonable assumption that every industry in a region should grow at the aggregate national rate, problems with industry classification and failure to take into account the interaction between industries, among others (Ray et al., 1990).

The multifactor partitioning (MFP) provides an improved version of shift share analysis by extending the effects in five (three from shift share). Five effects are identified namely: national growth effect, the industry effect, regional effect, interaction and allocation effect. The interaction effect refers to the interaction between industry and region. The allocation effect is the difference between actual growth rate in the nation and what it would have been had each industry been distributed in each region strictly in proportion to the regional total. The methodology is described further in Appendix III.

The MFP analysis utilized data from FAO involving the commodity groups of ISSCAAP (sharks, rays, chimaeras) which contain 27 type of commodities. Due to inconsistency of data, the time period chosen was for the years of 2009 - 2011. The selected commodities are: (i) shark fins, dried, salted, etc., (ii) shark fins, prepared or preserved, and (iii) sharks nei, frozen. The selected countries: Indonesia, Malaysia, Singapore and Thailand.

In this study, we examined the change in export values of shark and ray products for Malaysia with ASEAN as the benchmark region. The study utilized data from FAO for the

years of 2009, 2010, 2011. Table 3 presents the availability of data for each commodity reported by the selected countries. As mentioned earlier, commodities number 14 and 19 are the main products being exported by ASEAN countries.

Table 3: Export Data for Sharks and Rays Commodities Recorded by FAO, Selected Countries, 2011

No.	Commodity	BN	IND	MY	MM	PNG	PHL	SNG	SB	THA	TL	VN
1	Catsharks, nursehounds, fresh or chilled											
2	Catsharks, nursehounds, frozen											
3	Dogfish (Squalidae) and catshark fillets, frozen											
4	Dogfish (Squalidae), fresh or chilled											
5	Dogfish (Squalidae), frozen											
6	Porbeagle shark (Lamnanasus), fillets, frozen											
7	Porbeagle shark (Lamnanasus), fresh or chilled											
8	Porbeagle shark (Lamnanasus), frozen											
9	Shark fillets nei, frozen											
10	Shark fillets, fresh or chilled											
11	Shark fins, dried, salted, etc.	✓		✓		✓		✓		✓		✓
12	Shark fins, dried, unsalted	✓	✓									
13	Shark fins, frozen						✓					
15	Shark fins, salted and in brine but not dried or smoked			✓								
16	Shark liver oil											
17	Shark oil											
18	Sharks nei, fresh or chilled					✓				✓		
19	Sharks nei, frozen	✓	✓	✓		✓		✓		✓		✓
20	Sharks, dried, salted or in brine						✓					
21	Sharks, rays, chimaeras nei, frozen											
22	Sharks, rays, etc., dried, salted or in brine											
23	Sharks, rays, skates, fresh or chilled, nei		✓									
24	Sharks, rays, chimaeras, nei fillets fresh or chilled											
25	Sharks, rays, chimaeras, skates, nei fillets frozen											
26	Skates, fresh or chilled											
27	Skates, frozen											

Note: BN - Borneo, IND - Indonesia, MY-Malaysia. MM-Myanmar, PNG - Papua New Guinea, PHL-Philippines, SB-Solomon Islands, SNG-Singapore, THA-Thailand, TL-Timur-Leste and VN-Viet Nam
Source: FAO, 2015

Revealed Trade Advantage is one of the indicators to measure competitiveness. Competitiveness can be analyzed at three different levels: national or macroeconomic level, industrial level, and firm or micro-economic level (Bojnec and Ferto, 2009). Competitiveness can also be viewed from the spatial geographical dimension that is by comparing enterprises or trade within a region of a particular country, or between countries. Competitiveness at the national level is related to the concept of comparative advantage. The theory of comparative advantage predicts that trade flows exist as a result of relative cost differences between trading partners. It suggests that countries are

competitive in goods and services in which they have a relative cost advantage. The only difference between comparative advantage and competitiveness is that the latter includes market distortions, whereas the former does not.

Lafay (1992) underlined two additional differences between comparative advantage and competitiveness. First, competitiveness usually involves a cross country comparison for a particular product, while comparative advantage is measured between products within a country. Second, competitiveness is subject to changes in macroeconomic variables, whereas comparative advantage is structural in nature. Thus empirical analyses that focus on comparative advantage and competitiveness may lead to different results (e.g., Ferto and Hubbard, 2003).

The ability to compete in international and domestic markets depends on comparative advantages. Therefore, analyzing trade data (export and import) may contribute to a better understanding of the relative trade advantage of a country in relation to others. The description of the methodology is provided in Appendix IV.

5. Trade

5.1 World Market

Figure 1 represents a bigger picture of export trends of sharks and rays in the world between 1976-2011. It is apparent that the export has picked up steadily in the mid-1990s until 2011. As mentioned earlier, despite its higher value, the volume and growth of shark fins export is still small. However, the demand for shark meat has undergone a significant shift as being the major export item after mid 1990s until 2011. Note that the export of sharks and rays and its component is highly unstable which is expected as catch equation is determined by natural factors particularly weather.

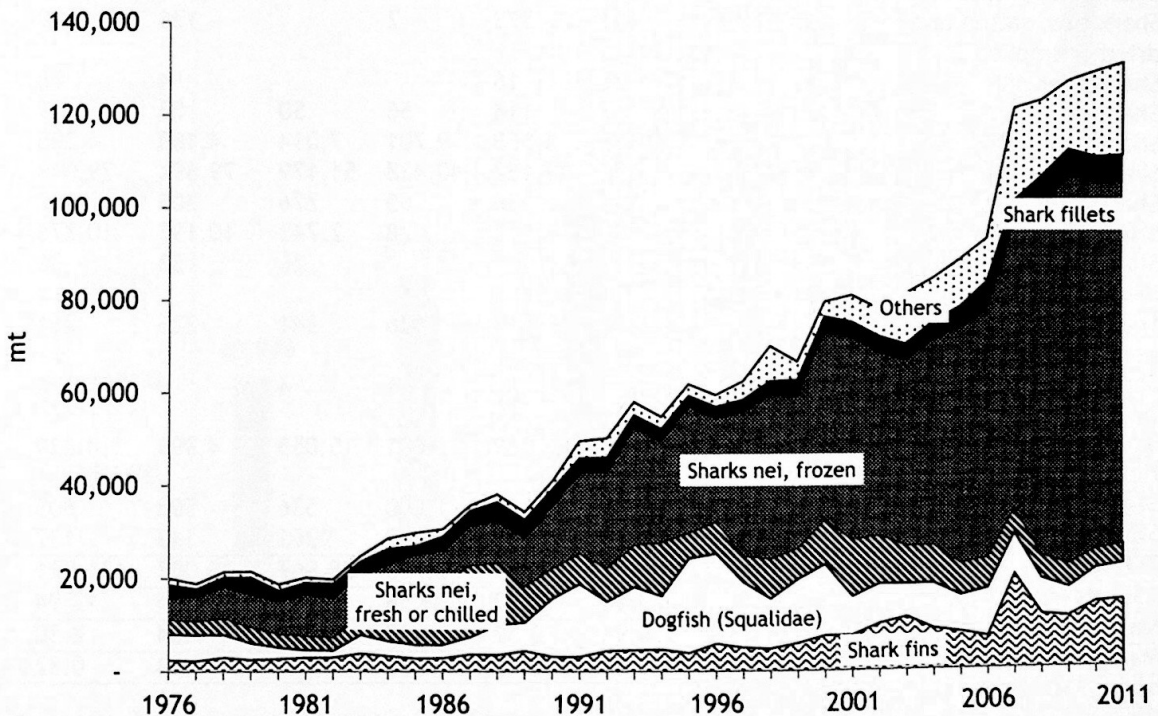


Figure 1: World Export of Sharks (mt), 1976-2011
Source: FAO, 2015

Table 4 presents the world export quantity of shark and ray products from 1990 to 2011. As shown, there are 27 sharks and rays commodities recorded by FAO which is based on ISSCAAP. Among all commodities, sharks nei, frozen (79,049 mt), sharks, rays, chimaeras nei, frozen (10,876 mt), and shark fins, prepared or preserved (8,647 mt) were the largest export quantity in 2011. The total export quantity has increased by 68% from 40,999 mt in 1990 to 131,921 mt in 2011. However the annual rate of growth appears to be unstable despite the upward trending (Figure 1). ASEAN's share of the world has shown a growing trend from 4.2% in 1990 to 13.9%. Malaysia's share remained small but increasing steadily from 0.04% to 0.32%. Similarly, Malaysia's share indicated a similar trend from 0.9% to 2.3% during the said period.

Table 4: The World Export Quantity of Shark and Ray Products (mt), 1990-2011

Commodity (Commodity)	1990	1995	2000	2005	2010	2011
Catsharks, nursehounds, fresh or chilled	65	96	257	938	662	702
Catsharks, nursehounds, frozen	51	127	54	110	148	85
Dogfish (Squalidae) and catshark fillets, frozen	333	88	95	428	139	260
Dogfish (Squalidae), fresh or chilled	10,424	10,421	9,734	3,908	3,090	2,814
Dogfish (Squalidae), frozen	1,715	9,868	5,567	3,552	4,143	4,758
Porbeagle shark (Lamnanasus), fillets, frozen					30	50
Porbeagle shark (Lamnanasus), fresh or chilled					1,052	1,698
Porbeagle shark (Lamnanasus), frozen					939	1079
Shark fillets nei, frozen	3,628	2,263	3,421	4,575	6,010	5,947
Shark fillets, fresh or chilled	6	19	28	33	18	23
Shark fins, dried, salted, etc.	1,437	2,272	3,893	3,222	1,823	1,950
Shark fins, dried, unsalted	1,099	1,207	2,530	2,774	3,579	2,662
Shark fins, frozen	394	5	1,027	481	788	939
Shark fins, prepared or preserved	115	80	36	1,461	7,770	8,647
Shark fins, salted and in brine but not dried or smoked	151	373	2		126	330
Shark liver oil	22	16			4	78
Shark oil	7	114	56	50	53	9
Sharks nei, fresh or chilled	6,627	5,568	9,701	7,014	4,188	4,305
Sharks nei, frozen	13,252	27,152	40,438	51,179	79,694	79,049
Sharks, dried, salted or in brine	1	36	65	276	205	122
Sharks, rays, chimaeras nei, frozen	909	3	28	2,743	10,197	10,876
Sharks, rays, etc., dried, salted or in brine				26	53	36
Sharks, rays, skates, fresh or chilled, nei	252	517	926	341	326	261
Sharks, rays, chimaeras, nei fillets fresh or chilled	2		1	4	0	0
Sharks, rays, chimaeras, skates, nei fillets frozen	132	569	681	5,055	4,399	4,439
Skates, fresh or chilled	39	830	1,000	536	508	605
Skates, frozen	338	275	240	261	143	197
TOTAL	40,999	61,899	79,780	88,967	130,087	131,921
ASEAN/World (%)	4.16	19.73	4.56	7.17	14.04	13.94
Malaysia/ASEAN (%)	0.94	0.52	0.30	1.66	1.64	2.30
Malaysia/World (%)	0.04	0.10	0.01	0.12	0.23	0.32

Source: FAO, 2015

In terms of composition, it is clear that shark meat particularly frozen accounted a larger share of world export (increased from about one-third in 1990 to 60% in 2011). The export of shark fin indicates a slow growth, accounting about 7.8% in 1990 to 11% in 2011. However, in term of value, shark fin fetched higher figure. According to FAO (2015), the total declared value of world exports of shark fin was USD438.6 mn for 17, 154 mt imported in 2011. On the other hand the value of world imports of shark meat were USD380 mn for 121 641 mt. The relatively high unit value of trade of shark fin is due to cultural factor in that the demand for fin is high among Chinese consumers particularly in Asian region. The retail price of fin is among the highest in the seafood category. The economic improvement of these countries has triggered a higher import demand for this delicacy among the high income consumers and hence higher price of this commodity.

Similarly the share of processed shark meat (dried and salted) also indicates a rising trend. The growth of shark meat was driven by demand for seafood when the potential for increased production for alternative wild marine fish stocks is limited. It was also triggered by finning regulation that require shark carcasses be landed together with their fin at 5% fin to carcass weight ratio hence prompting the development of markets in which the meat can be sold (FAO, 2015).

The contributions of ASEAN are estimated about 7% and 14% in 2005 and 2010, respectively. Figure 2 shows the total export quantity of shark and ray products for the world and ASEAN countries from 1990 to 2011. As the figure indicates, ASEAN accounted for less than 15% of the world total sharks and rays export quantities over the last two decades. The total export of the world and ASEAN were 131,921 and 18,392 mt in 2011, respectively.

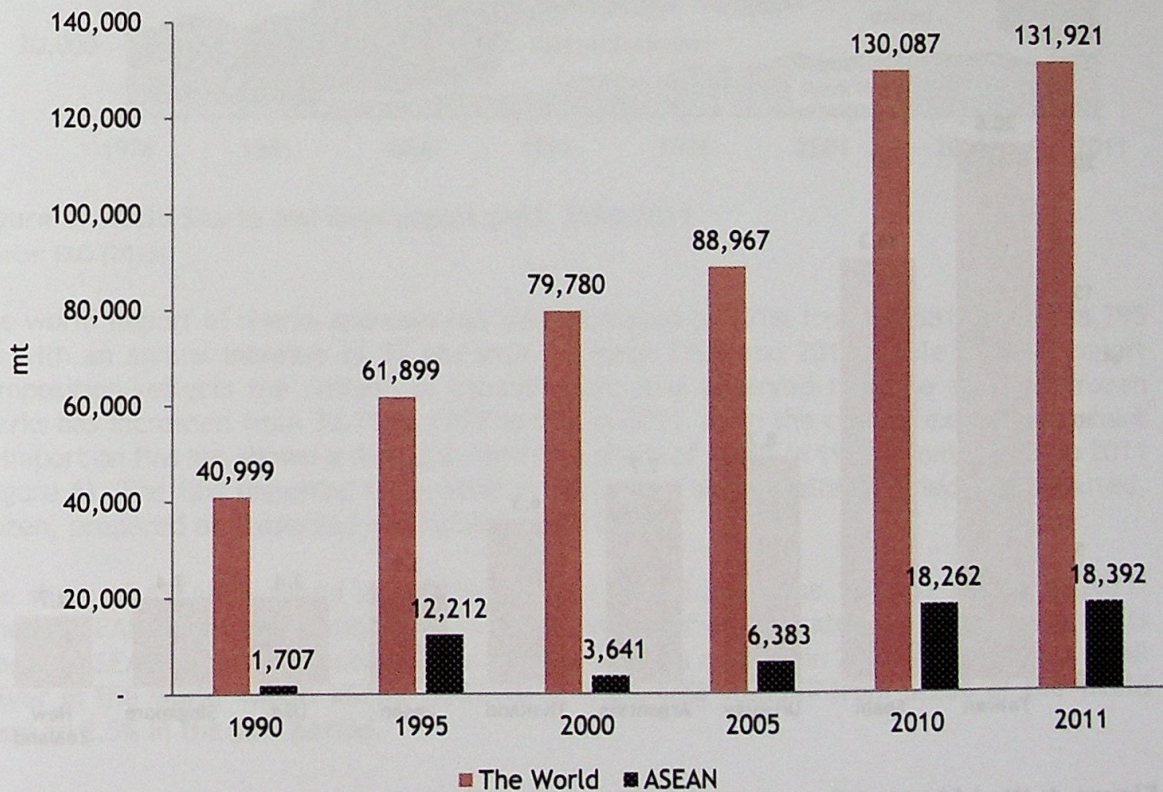


Figure 2: Total Export Quantity of Shark and Ray Products (mt), the World and ASEAN, 1990-2011

Source: FAO, 2015

As shown in Figure 3, ASEAN's export has increased in term of higher volume and value but also in experienced a change in term of composition. In 1990 about half of ASEAN export was shark fin but by 2011 it has increased to 70.3%. Frozen sharks accounted for 37.4% of the export in 1995 but has reduced to 10% in 2011. These data shows the growing importance of shark fin trade in ASEAN.

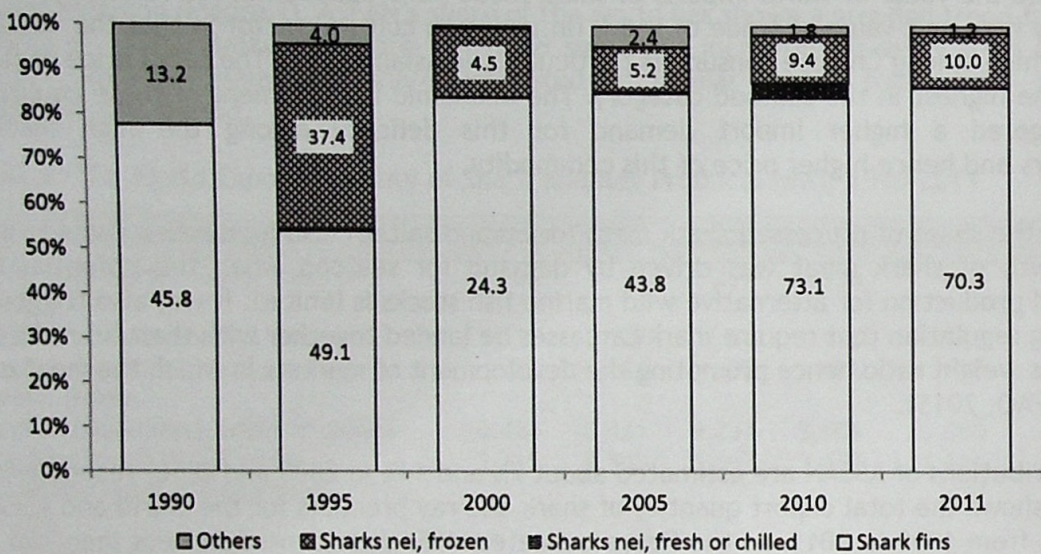


Figure 3: Contribution of ASEAN to the World Export by Commodity, 1990-2011 (%)
 Source: FAO, 2015

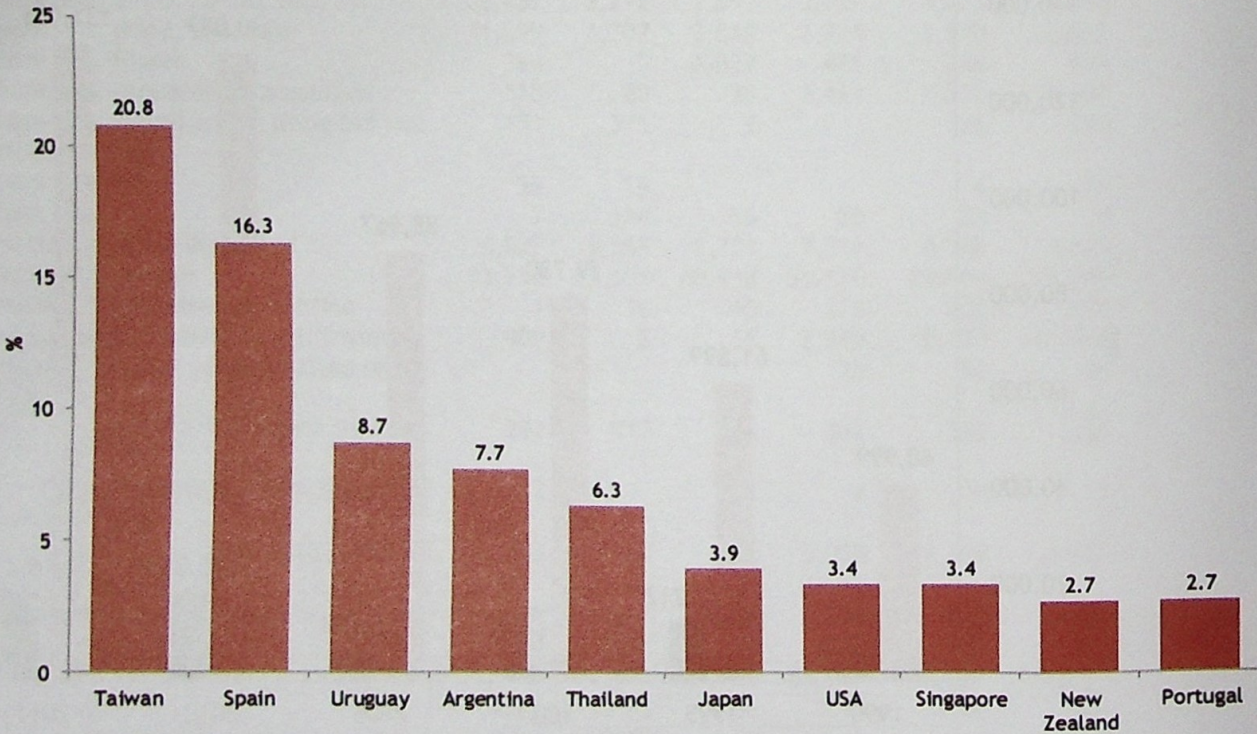


Figure 4: World Largest Exporters of Sharks and Rays (%), 2011
 Source: FAO, 2015

The total world export of sharks and rays in 2011 was recorded at 131,921 mt. The ten top largest exporters accounted for 75.8% of the world export. As shown in Figure 4, the top five accounted for 59.8% which were: Taiwan (accounted for 28% of the world export), Spain (16.3%), Uruguay (8.7%), Argentina (6.3%) and Thailand (6.3%).

The long term perspective of sharks and rays import (1976-2011) is depicted in Figure 5. Similar to the export sector, import has picked up significantly since mid 1990s. The import is unstable despite the upward trending and shark meat has become an important import item. Shark fin is still low in share and volume but is growing steadily between the 1980s but mid 1990s saw an increase in rate of growth compared to what it was earlier.

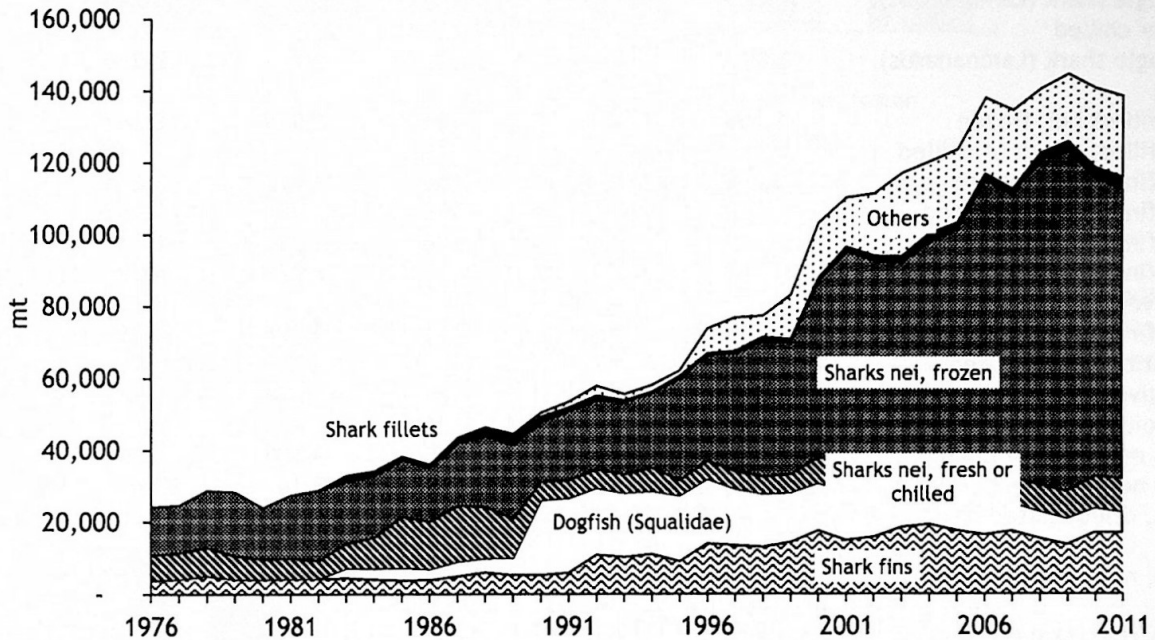


Figure 5: World Sharks and Rays Import (mt), 1990-2011

Source: FAO (2015).

The world import of sharks and rays has also increased by 270% from 50,581 mt to 138,795 mt with an annual increase of 5% per year between 1990 and 2011 (Table 5). The import composition reflects the pattern of consumption. It is observed that the share of frozen sharks has increased from 32.7% in 1990 to 58% in 2011. As in the case of export, the share of import on fins has shown a slow growth with a share of 10.6% in 1990 to only 12.4% in 2011 (Figure 6). The fins imported have been dried (salted and unsalted), dried and unsalted, frozen, prepared or preserved and salted and in brine.

The share of ASEAN in world import has tripled from 3.7% in the 1990 to 10.04% in 2011. Among ASEAN countries, Malaysia is an active importer as indicated by an increase of its share of ASEAN import from about 7% in 1990 to about a quarter in 2011. Malaysia is a small player in the world import sector however it is growing steadily from 0.26% of the world share to 2.5% in the said period.

Table 5: World Import of Sharks and Rays (mt), 1990-2011

Commodity (Commodity)	1990	1995	2000	2005	2010	2011
Catsharks, nursehounds, fresh or chilled	233	176	319	323	796	1,011
Catsharks, nursehounds, frozen	298	656	44	23	72	134
Dogfish (Squalidae) and catshark fillets, frozen	197	280	130	1,058	571	434
Dogfish (Squalidae), fresh or chilled	11,033	11,761	7,718	3,855	2,404	1,760
Dogfish (Squalidae), frozen	9,559	6,259	5,368	4,718	3,807	3,555
Porbeagle shark (Lamnanasus), fillets, frozen	-	-	-	-	92	33
Porbeagle shark (Lamnanasus), fresh or chilled	-	-	-	-	244	298
Porbeagle shark (Lamnanasus), frozen	-	-	-	-	2,296	2,353
Shark fillets nei, frozen	1,593	834	1,124	1,919	2,647	3,580
Shark fillets, fresh or chilled	-	-	-	-	10	8
Shark fins, dried, salted, etc.	5,009	7,660	12,760	9,912	5,643	6,014
Shark fins, dried, unsalted	52	25	238	486	468	492
Shark fins, frozen	2	17	376	397	1,057	1,134
Shark fins, prepared or preserved	68	156	17	2,278	4,997	4,343
Shark fins, salted and in brine but not dried or smoked	211	1,200	4,291	4,576	4,959	5,171
Shark liver oil	357	136	84	74	81	136
Shark oil	187	312	26	36	19	-
Sharks nei, fresh or chilled	5,138	4,292	7,145	7,109	8,909	9,257
Sharks nei, frozen	16,563	28,294	48,937	67,161	83,435	80,451
Sharks, dried, salted or in brine	-	7	-	-	1	2
Sharks, rays, chimaeras nei, frozen	-	20	5,474	9,574	8,707	8,432
Sharks, rays, skates, fresh or chilled, nei	-	21	47	79	5	3
Sharks, rays, chimaeras, nei fillets fresh or chilled	-	-	-	-	-	-
Sharks, rays, chimaeras, skates, nei fillets frozen	-	3	5	64	574	640
Skates, fresh or chilled	-	1	3	-	-	-
Skates, frozen	81	181	9,286	10,202	9,151	9,554
TOTAL	50,581	62,291	103,392	123,844	140,945	138,795
ASEAN/World (%)	3.70	5.31	2.58	4.95	8.45	10.04
Malaysia/ASEAN (%)	6.95	4.86	2.93	14.62	31.28	25.17
Malaysia/World (%)	0.26	0.26	0.08	0.72	2.64	2.53

Source: FAO (2015)

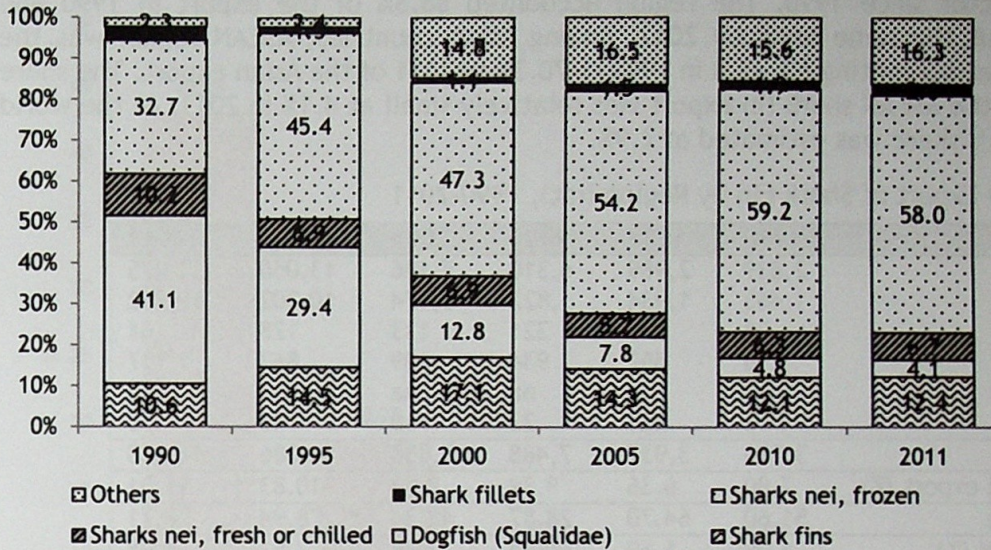


Figure 6: World Import of Sharks and Rays by Commodity Type (mt), 1976-2011
 Source: FAO, 2015

As illustrated in Figure 7, the top ten importers of sharks and rays accounted for almost 90% of the world import. Malaysia ranked 11th in the said list. The top five accounted about two thirds of the world total imports. The largest five importers were Brazil, Korea, Spain, Uruguay and Hong Kong.

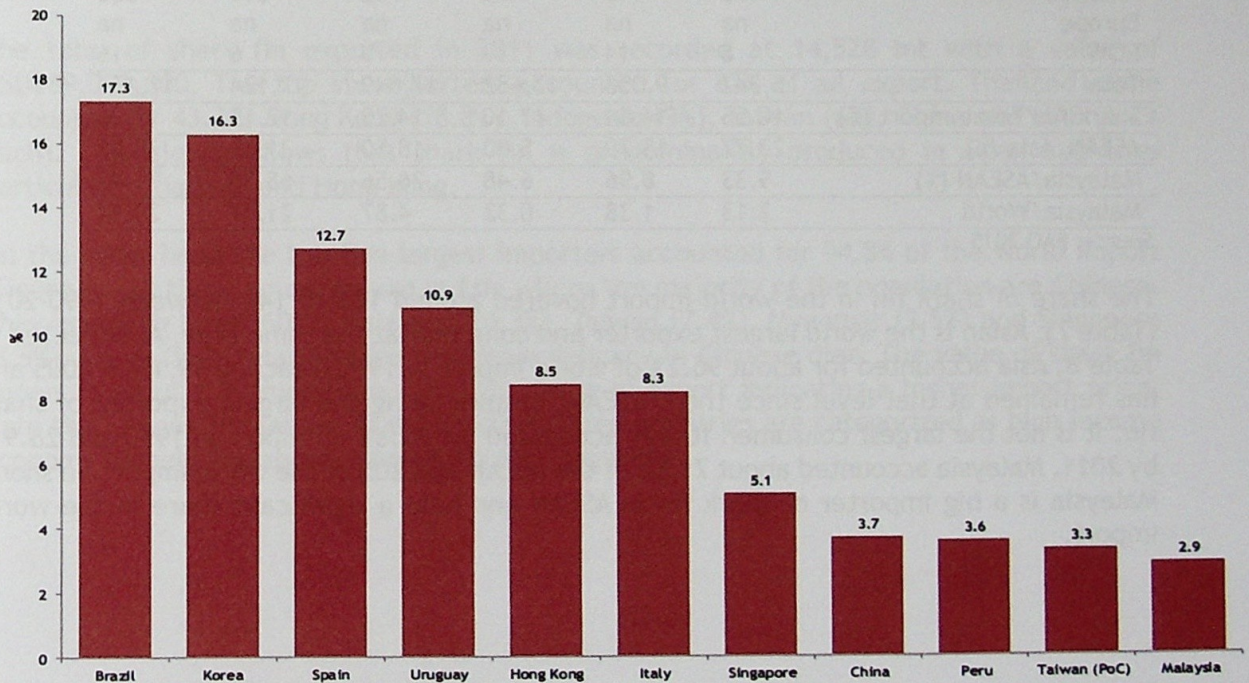


Figure 7: World Largest Importers of Sharks and Rays (%), 2011
 Source: FAO, 2015

The export of shark fin deserves further discussion. Tables 6 and 7 indicate the world export and import of shark fin by region respectively. The tables provide a number of observations. The share of shark fin in the world export was 7.8% in 1990 but increased to 11.01% in 2011. Among the region, it is apparent that ASIAN region played an active role in

the export sector since 1990. The region accounted 88.8% of the export in 1990 and remained about the same level by 2012. Among Asian countries, ASEAN region was the biggest exporter accounting for 45.8 in 1990 to 70.3% in 2011 of the Asian export. The share of Malaysia in the ASEAN shark fin export was relatively small at 4.1% in 2011. At the world level, Malaysia's share was estimated at 2.9%.

Table 6: World Export of Shark Fin by Region (mt), 1990-2011

Region/Year	1990	1995	2000	2005	2010	2011
Asia	2,839	2,989	6,310	7,186	13,050	12,975
ASEAN	1,465	1,934	1,822	3,474	10,302	10,212
Africa	98	175	221	133	128	161
America	256	552	934	609	862	1,317
Europe	na	na	na	na	na	na
ROW	3	221	23	10	46	75
Total	3,196	3,937	7,488	7,938	14,086	14,528
Shark fin/Total export (%)	7.80	6.36	9.39	8.92	10.83	11.01
ASEAN/Asia (%)	51.60	64.70	28.87	48.34	78.94	78.71
Malaysia/ASEAN (%)	1.09	1.60	0.55	2.76	2.52	4.08
Malaysia/World	0.50	0.79	0.13	1.21	1.85	2.87

Source: FAO 2015

Table 7: World Import of Shark Fin by Region (mt), 1990-2011

Region/Year	1990	1995	2000	2005	2010	2011
Asia	5,141	8,886	17,594	17,498	16,900	16,905
ASEAN	1,222	1,395	879	3,238	5,382	4,882
Africa	1	16	22	-	-	-
America	192	142	66	142	218	233
Europe	na	na	na	na	na	na
ROW	8	14	-	9	6	16
Total	5,342	9,058	17,682	17,649	17,124	17,154
Shark fin/Total import (%)	10.56	14.54	17.10	14.25	12.15	12.36
ASEAN/Asia (%)	23.77	15.70	5.00	18.50	31.85	28.88
Malaysia/ASEAN (%)	9.33	8.96	6.48	26.56	68.30	71.47
Malaysia/World	2.13	1.38	0.32	4.87	21.47	20.34

Source: FAO 2015

The share of shark fin in the world import hovered around 12% to 14% between 1990-2011 (Table 7). Asian is the world largest exporter and consumer at the same time. As reflected in Table 8, Asia accounted for about 96.2% of world import in 1990, reached 99.1% in 2005 and has remained at that level since then. ASEAN, despite being the largest exported of shark fin, it is not the largest consumer. It only accounted for 23.8% of import in 1990 and 28.9% by 2011. Malaysia accounted about 71.5% of the ASEAN and 20% of the world import. In short, Malaysia is a big importer of shark fin in ASEAN and hold a significant share in the world import.

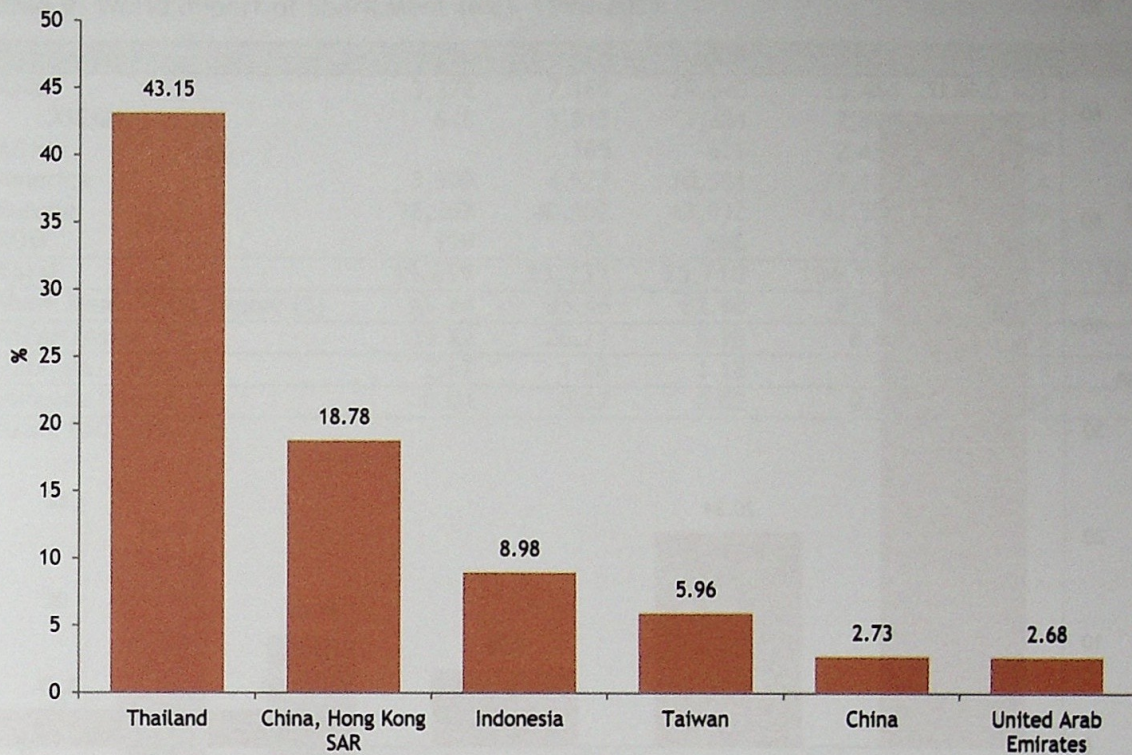


Figure 8: World Largest Exporters of Shark Fin (%), 2011

Source: FAO (2015)

The total of shark fin exported in 2011 was recorded at 14,528 mt with a value of USD289,091,000. The top six exporters accounted for 82% of all export. Thailand alone accounted for 43.3%, Hong Kong (18.8%), Indonesia (9%), Taiwan (6%), China and UAE (2.7% each). This clearly shows that shark fin is predominantly produced in Asian countries particularly Thailand and Hong Kong.

On the other hand the top five largest importers accounted for 94.8% of the world import (Figure 9). All these countries are in Asia where the majority of the population are Chinese. They are Hong Kong (60%), Malaysia (20.3%), Taiwan (7.4%), Myanmar (3.5%) and Singapore (3.5%). Shark fin is relatively an expensive delicacy in Chinese diet. The value of shark fin import is about 1.5 times higher than the value of export indicating a higher import price. Note that among the largest five importers, three countries are categorized as high income economy namely Singapore, Hong Kong and Singapore.

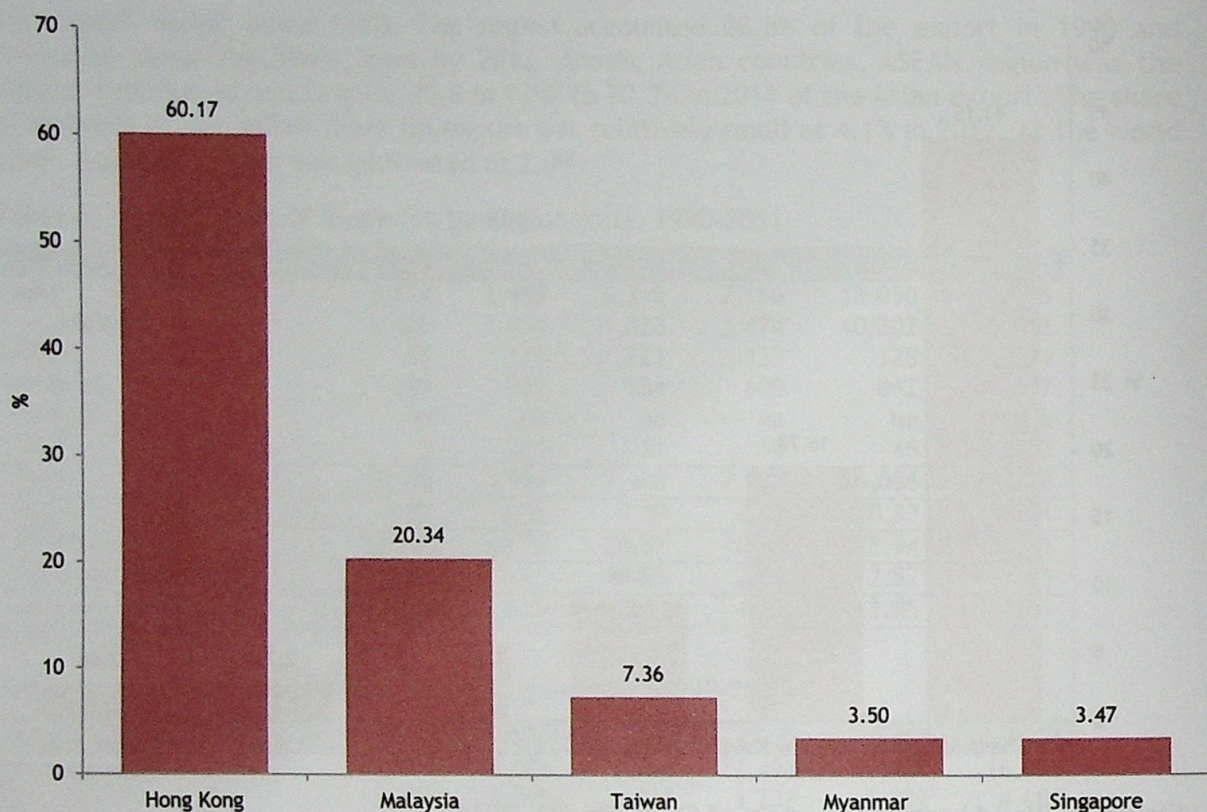


Figure 9: World Largest Importer of Shark Fin (%), 2011

Source: FAO (2015)

As shown in Table 8, shark meat is a major component in the world export of sharks and rays, accounting about 90% of the total. The largest exporters were Asian region accounting for 37.7% of the world export in 2011. Unlike in the case of shark fin, the share of ASEAN in the Asian trade was smaller at about 18.4%. Malaysia held a small share at 0.07% and 0.01% in the ASEAN and world export of shark meat respectively.

Table 8: World Export of Shark Meat by Region (mt), 1990-2011

Region/Year	1990	1995	2000	2005	2010	2011
Asia	7,277	15,985	10,468	23,308	44,024	44,382
ASEAN	242	10,278	1,830	2,909	7,960	8,180
Africa	175	406	820	2,902	5,159	5,150
America	9,431	19,934	22,559	24,105	34,966	33,620
Europe	18,965	17,810	34,265	26,660	27,144	30,526
ROW	1,956	3,851	4,202	4,112	4,963	3,999
Total	37,804	57,986	72,314	81,087	116,256	117,677
Shark Meat/Total Export (%)	92.21	93.68	90.64	91.14	89.37	89.20
ASEAN/Asian (%)	3.33	64.30	17.48	12.48	18.08	18.43
Malaysia/ASEAN (%)	-	0.32	0.66	0.34	0.50	0.07
Malaysia/World	-	0.06	0.02	0.01	0.03	0.01

Source: FAO 2015

Asian and ASEAN regions did not play a big role unlike in the case of shark fin import. Asian's share of import was about 31% of the world import in 2011 (Table 9). Other major importers were selected countries in the north and South American and European countries. Similarly, ASEAN contributed a quarter of the ASIAN total import. Malaysia's share in ASEAN import has declined from 2.5% to 0.21% between 1990-2011. Its share in the world import has remained around 0.03% in the said period.

Table 9: World Import of Shark Meat (mt), 1990-2011

Region/Year	1990	1995	2000	2005	2010	2011
Asian	3,372	7,169	29,840	33,464	38,103	37,488
ASEAN	648	1,915	1,784	2,897	6,534	9,054
Africa	-	165	671	2,481	589	1,158
America	3,500	4,927	10,581	27,177	51,154	44,776
Europe	38,253	40,502	43,932	42,596	33,389	37,764
ROW	114	470	686	477	586	455
Total	45,239	53,233	85,710	106,195	123,821	121,641
Shark Meat/Total Import (%)	89.44	85.46	82.90	85.75	87.85	87.64
ASEAN/Asian (%)	19.22	26.71	5.98	8.66	17.15	24.15
Malaysia/ASEAN (%)	2.47	1.88	1.18	1.28	0.78	0.21
Malaysia/World	0.04	0.07	0.02	0.03	0.04	0.02

Source: FAO 2015

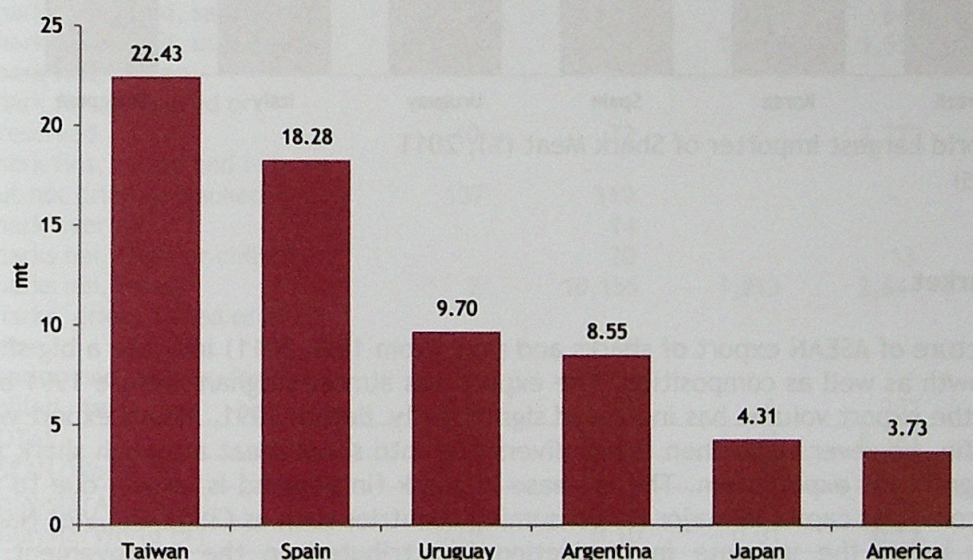


Figure 10: World Largest Exporter of Shark Meat (%), 2011

Source: FAO (2015)

As at 2011 the world export of shark meat stood at 117,677 mt worth USD432,649,000. The top exporters were Taiwan (22.4%), Spain (18.3%), Uruguay (9.7%), Argentina (8.6%), Japan (4.3%) and USA (3.7%) (Figure 10). The six countries accounted more than two-thirds of world exports. Unlike shark fin, the import value of shark meat is lower and the exporters are worldwide beyond Asian shores. The import volume and value of shark meat in 2011 were 121,641 and USD379,845,000 respectively. The world largest importers in 2011 were Brazil (17.3%), Korea (16.3), Spain (12.7%), Uruguay (10.9%), Italy (8.3%) and Singapore (4.6%). These countries accounted for 70% of world import of shark meat (Figure 11).

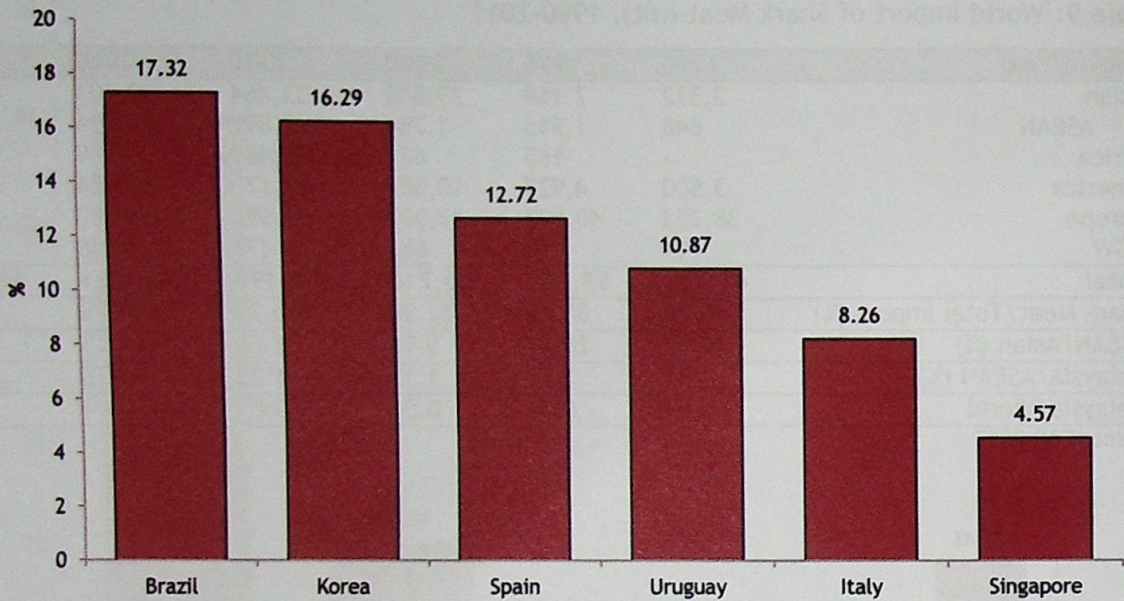


Figure 11: World Largest Importer of Shark Meat (%), 2011

Source: FAO (2015)

5.2 ASEAN Market

The bigger picture of ASEAN export of sharks and rays (from 1976-2011) indicate a big shift in term of growth as well as composition. The export was almost stagnant before 1991 but consequently the export volume has increased significantly. Before 1991, ASEAN export was largely shark fin, however since then it has diversified into shark meat although shark fin remained a significant export item. The increase in shark fin demand is largely due to an increase in income per capita in major fin consuming countries such as China and Viet Nam. On the other hand, the increase in production is attributed to the improvement in capture technology among commercial and small fishers.

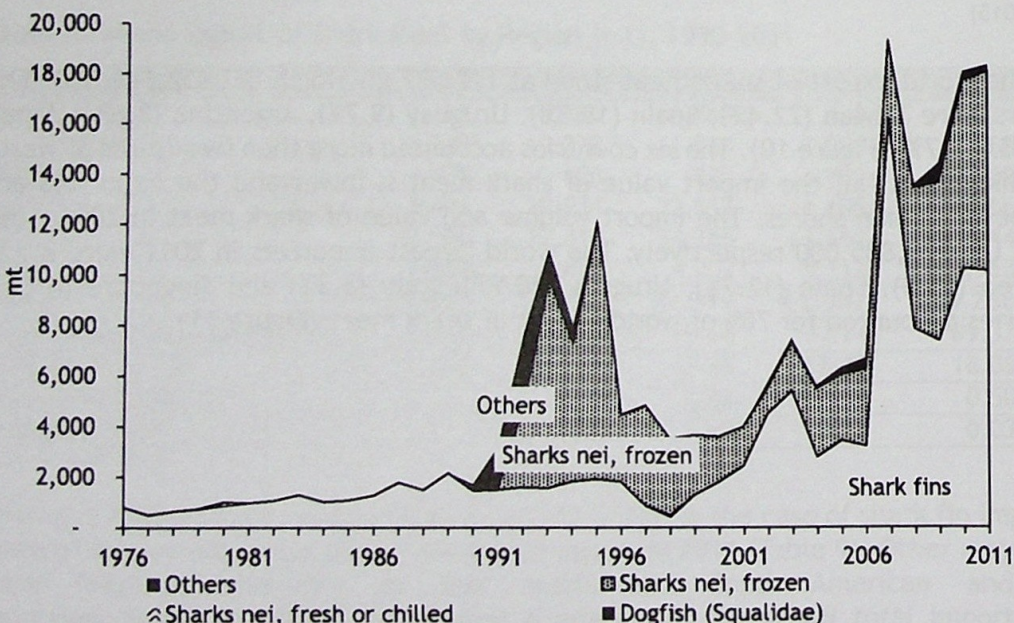


Figure 12: ASEAN Export Quantity Shark and Ray Products (mt), 1976-2011

Source: FAO, 2015

The main commodities exported by ASEAN countries were: (i) shark fins, prepared or preserved, (ii) sharks nei, frozen; and iii) shark fins, dried, unsalted (Table 10). The aggregated export has increased by 91% from 1,707 mt in 1990 to 18,392 mt in 2011. The export of “shark fins, prepared or preserved” and “sharks nei, frozen” experienced sharp increases from only 40 mt and 2 mt in 1990 to about 8,000 mt and 8,400 mt in 2011, respectively.

The composition of ASEAN export has shifted from a concentration on shark fin (about 85.8%) in 1990 to a mode diversified products. By 2011, about 60% of export comprised shark fin and 39.1% were “Sharks, nei, frozen” (Figure 13).

Table 10: ASEAN Export Quantity of Shark and Ray Products (mt), 1990-2011

Commodity (Commodity)	1990	1995	2000	2005	2010	2011
Dogfish (Squalidae), frozen	-	-	-	-	-	-
Shark fins, dried, salted, etc.	866	1,096	656	648	380	427
Shark fins, dried, unsalted	422	447	1,166	1,554	2,318	1,394
Shark fins, frozen	-	-	-	-	35	2
Shark fins, prepared or preserved	40	72	-	1,272	7,567	8,388
Shark fins, salted and in brine but not dried or smoked	137	319	-	-	2	1
Shark liver oil	-	14	-	-	-	-
Sharks nei, fresh or chilled	-	20	-	13	119	-
Sharks nei, frozen	2	10,155	1,813	2,644	7,512	7,932
Sharks, dried, salted or in brine	-	36	-	-	133	101
Sharks, rays, skates, fresh or chilled, nei	240	53	6	252	196	147
TOTAL	1,707	12,212	3,641	6,383	18,262	18,392
ASEAN/World (%)	4.16	19.73	4.56	7.17	14.04	13.94
Malaysia/ASEAN (%)	0.94	0.52	0.30	1.66	1.64	2.30
Malaysia/World (%)	0.04	0.10	0.01	0.12	0.23	0.32

Source: FAO, 2015

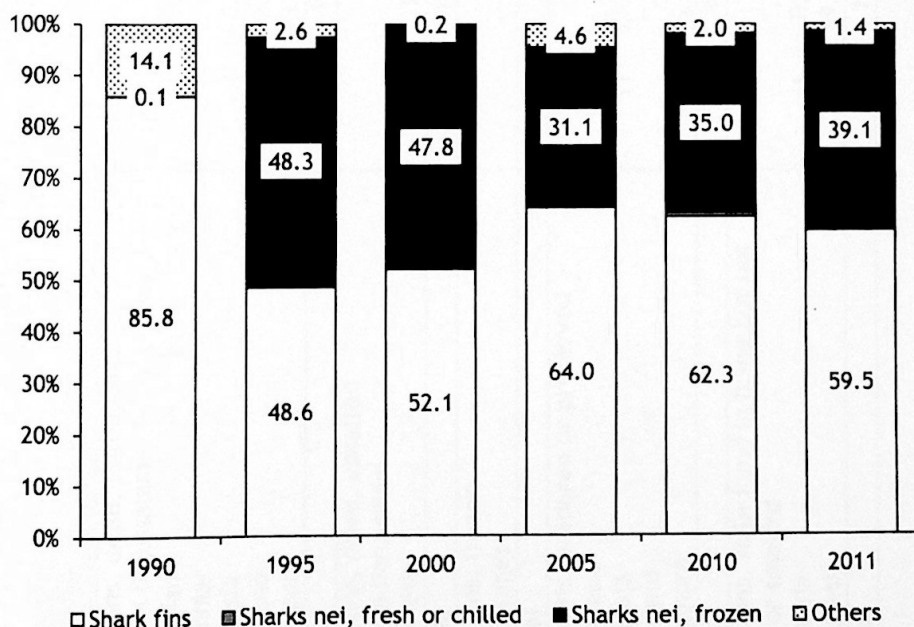


Figure 13: Composition of ASEAN Exports of Sharks and Rays (%), 1990 - 2011

Source: FAO (2015)

Table 11 provides information on ASEAN export of sharks and rays by country, 1990-2011. Each commodity has its own market characteristics. For instance in the case of “Shark fins, dried, salted, etc”, the total export has declined, so was the role of Singapore as the major exporter. By 2011, Viet Nam provided more than half of the commodity for ASEAN export. Indonesia was the sole exporter of Shark fins, dried, unsalted. Thailand was the major exporter (91%) of “Shark fins, prepared or preserved” and Sharks nei, fresh or chilled (100%) in 2011. Despite not being a producer, Singapore is active in the export of “Sharks nei, frozen” with an export share of 52%, Viet Nam (24.2%), Indonesia (15.4%), Thailand (7.5%) and Malaysia (0.08%). Indonesia is the sole exporter of Sharks, rays, skates, fresh or chilled, nei since 1990 albeit at a declining rate.

Table 11: ASEAN Export Quantity of Sharks and Rays (%) by Country and Category

Commodity	1990		1995		2000		2005		2010		2011	
	mt	%	mt	%	mt	%	mt	%	mt	%	mt	%
Shark fins, dried, salted, etc.												
Brunei Darussalam												
Viet Nam	31	3.58	142	12.96	28	4.27	12	1.86	98	25.79	223	52.22
Myanmar												
Malaysia	4	0.46	22	2.01	10	1.52	29	4.49	20	5.26	1	0.23
Thailand	25	2.89	61	5.57	70	10.67	44	6.81	20	5.26	23	5.39
Singapore	806	93.07	871	79.47	548	83.54	333	51.55	242	63.68	180	42.15
Total	866	100	1,096	100	656	100	646	100	380	100	427	100
Shark fins, dried, unsalted												
Brunei Darussalam												
Indonesia	422	100	447	100	1,166	100	1,554	100	2,318	100	1,392	99.86
Total	422	100	447	100	1,166	100	1,554	100	2,318	100	1,394	100
Shark fins, frozen												
Philippines												
Total									35	100	2	100
									35	100	2	100
Shark fins, prepared or preserved												
Indonesia												
Malaysia	11	27.50	9	12.50			67	5.27	60	0.79	215	2.56
Thailand									238	3.15	415	4.95
Singapore	29	72.50	63	87.50					7,121	94.11	7,700	91.80
Total	40	100	72	100			1,205	94.73	148	1.96	58	0.69
									1,272	100	8,388	100
Shark fins, salted and in brine but not dried or smoked												
Malaysia	1	0.73										
Indonesia	136	99.27	319	100					2	100	1	100
Total	137	100	319	100					2	100	1	100

Table 11: Cont'd

Commodity	1990		1995		2000		2005		2010		2011	
	mt	%	mt	%	mt	%	mt	%	mt	%	mt	%
Shark liver oil												
Philippines			14	100								
Total			14	100								
Sharks nei, fresh or chilled							13	100				
Viet Nam												
Singapore			2	10.00								
Thailand			18	90.00					119	100		
Philippines												
Malaysia												
Total			20	100			13	100	119	100		
Sharks nei, frozen												
Viet Nam			19	0.19			22	0.83	1,791	23.84	1,920	24.21
Singapore			1,870	18.41		1,671	1,622	61.35	3,066	40.81	4,188	52.80
Thailand			3	0.03			33	1.25	896	11.93	597	7.53
Malaysia	2	100	33	0.32	1	0.06	10	0.38	40	0.53	6	0.08
Indonesia			8,230	81.04	141	7.78	957	36.20	1,719	22.88	1,220	15.38
Brunei Darussalam											1	0.01
Total	2	100	10,155	100	1,813	100	2,644	100	7,512	100	7,932	100
Sharks, dried, salted or in brine												
Philippines			36	100					133	100	101	100
Total			36	100					133	100	101	100
Sharks, rays, skates, fresh or chilled, nei												
Indonesia	240	100	53	100	6	100	252	100	196	100	147	100
Total	240	100	53	100	6	100	252	100	196	100	147	100
TOTAL	1,707		12,212		3,641		6,381		18,262		18,392	

Source: FAO, 2015

Table 12 indicates that there is a structural change in terms of the importance of each of the country in the ASEAN export sector. In 1990, the export were concentrated towards two countries: Indonesia and Singapore with each having a market share 48.9% and 46.7% respectively. However by 2011, the export was diversified with the emergence of new exporters such as Thailand (accounting 45.2% of the export), Viet Nam (11.7%) in 2011.

Table 12: ASEAN Export of Sharks and Rays by Country (%), 1990-2011

Country	1990	1995	2000	2005	2010	2011
Malaysia	0.9	0.52	0.3	1.7	1.6	2.3
Viet Nam	1.8	1.32	0.8	4.1	10.3	11.7
Singapore	48.9	22.98	60.9	49.5	18.9	24.1
Thailand	1.6	0.67	1.9	1.2	44.7	45.2
Indonesia	46.7	74.10	36.1	43.3	23.5	16.2
Brunei Darussalam	-	-	-	0.2	-	0.0
Philippines	-	0.41	-	-	0.9	0.6
Total	100	100	100	100	100	100

Source: FAO, 2015

Table 13 shows the upward trending of ASEAN import of sharks and rays from 1,870 mt in 1990 to 13,936 mt in 2011. The import composition has reversed from the focus on “Sharks fins, salted and dried” (63% in 1990) to “Sharks nei frozen (64,8% in 2011). By 2011, the import share of “Sharks fins, salted and dried” declined to a mere 3%. The share of “Shark fins, prepared or preserved has increased from 4.4% in 1995 and remained about a third of import since 2005 (Figure 14). These data shows the growing popularity of frozen sharks among consumers.

Table 13: ASEAN Import of Sharks and Rays (mt)

Commodity (Commodity)	1990	1995	2000	2005	2010	2011
Dogfish (Squalidae), frozen	-	-	-	-	-	-
Shark fins, dried, salted, etc.	1,178	1,234	751	639	364	419
Shark fins, dried, unsalted	1	3	127	332	163	101
Shark fins, prepared or preserved	40	146	-	2,263	4,850	4,311
Shark fins, salted and in brine but not dried or smoked	3	12	1	4	5	51
Shark liver oil	-	3	-	-	-	-
Sharks nei, fresh or chilled	-	85	103	126	31	19
Sharks nei, frozen	648	1,827	1,681	2,771	6,503	9,035
Sharks, dried, salted or in brine	-	-	-	-	-	-
TOTAL	1,870	3,310	2,663	6,135	11,916	13,936
ASEAN/World (%)	3.70	5.31	2.58	4.95	8.45	10.04
Malaysia/ASEAN (%)	6.95	4.86	2.93	14.62	31.28	25.17
Malaysia/World (%)	0.26	0.26	0.08	0.72	2.64	2.53

Source: FAO (2015)

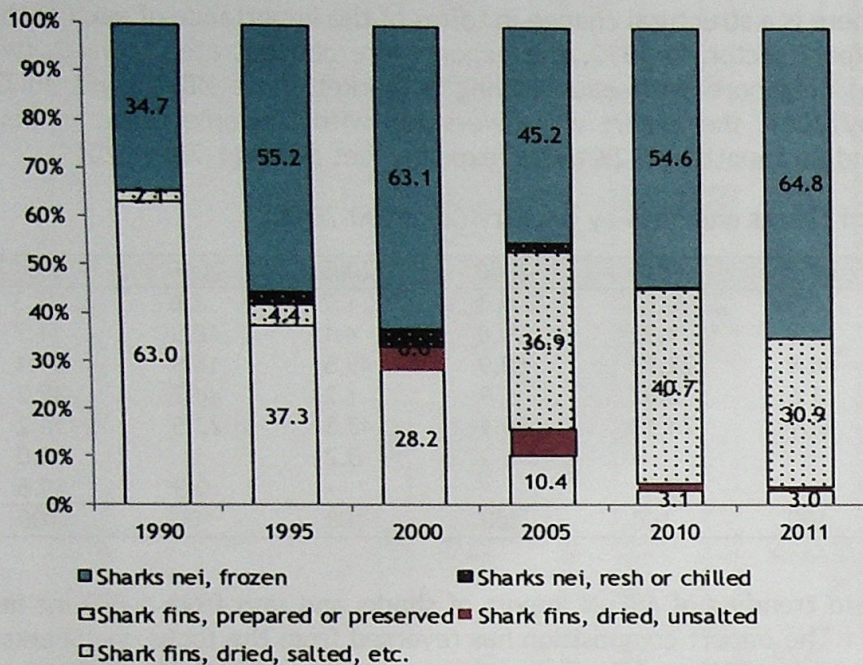


Figure 14: Figure ASEAN Import Composition (%)

Source: FAO (2015)

The import of sharks and rays by country is presented in Table 14. Singapore was the largest ASEAN importer of “Shark fins, dried, salted, etc.” accounting for 75.2% of the total import in 2011 despite the decline in volume. The other major importers were Thailand (15.8%) and Malaysia (9%). Imports of “Shark fins, prepared or preserved” registered a significant increase and Malaysia has increased its share from 55% to 78.9% between 1990 to 2011. A similar trend is observed for “Sharks nei, frozen” where its volume has increased by thirteen-fold and the importers has diversified. In 1990, Thailand was the sole importer but by 2011 almost all ASEAN countries have participated in the import sector of this commodity. Singapore’s share of the import reached 61.3% in 2011 followed by Viet Nam, Thailand (9.8%) and Malaysia (0.2%).

Table 14: ASEAN Import of Sharks and Rays by Country and Category, 1990-2011

Country (Country)	1990		1995		2000		2005		2010		2011	
	mt	%	mt	%	mt	%	mt	%	mt	%	mt	%
Shark fins, dried, salted, etc.												
Lao People's Dem. Rep.												
Philippines												
Viet Nam												
Brunei Darussalam	16	1.36			56	7.46	89	13.93	15	4.12	38	9.07
Malaysia	89	7.56	114	9.24	66	8.79	113	17.68	51	14.01	66	15.75
Thailand	67	5.69	137	11.10	629	83.75	437	68.39	298	81.87	315	75.18
Singapore	1,006	85.40	983	79.66	751	100	639	100	364	100	419	100
Total	1,178	100	1,234	100	751	100	639	100	364	100	419	100
Shark fins, dried, unsalted												
Lao People's Dem. Rep.												
Indonesia	1	100	3	100	127	100	332	100	163	100	101	100
Brunei Darussalam												
Total	1	100	3	100	127	100	332	100	163	100	101	100
Shark fins, prepared or preserved												
Myanmar												
Brunei Darussalam												
Indonesia												
Lao People's Dem. Rep.												
Thailand												
Singapore	18	45.00	144	98.63			1,496	66.11	293	6.04	30	0.70
Malaysia	22	55.00	2	1.37			767	33.89	3,656	75.38	280	6.50
Total	40	100	146	100			2,263	100	4,850	100	4,311	100
Shark fins, salted and in brine but not dried or smoked												
Malaysia	3	100	9	75	1	100	4	100	5	100	51	100
Indonesia			3	25								
Total	3	100	12	100	1	100	4	100	5	100	51	100

Table 14: Cont'd

Country (Country)	1990		1995		2000		2005		2010		2011	
	mt	%	mt	%	mt	%	mt	%	mt	%	mt	%
<i>Shark liver oil</i>												
Philippines			3	100								
Total			3	100								
<i>Sharks nei, fresh or chilled</i>												
Viet Nam							10	8				
Indonesia												
Brunei Darussalam												
Singapore			85	100	103	100	116	92	31	100	19	100
Thailand												
Philippines												
Malaysia												
Total			85	100	103	100	126	100	31	100	19	100
<i>Sharks nei, frozen</i>												
Viet Nam							56	2.02	2,098	32.26	2,170	24.02
Singapore			1,401	76.68	1,447	86.08	1,825	65.86	3,273	50.33	5,537	61.28
Thailand	632	97.53	390	1.35	210	12.49	236	8.52	614	9.44	889	9.84
Philippines							351	12.67	336	5.17	214	2.37
Malaysia	16	2.47	36	1.97	21	1.25	37	1.34	51	0.78	19	0.21
Indonesia							266	9.60	130	2.00	206	2.28
Myanmar												
Brunei Darussalam					3				1			
Total	648	100	1,827	100	1,681	100	2,771	100	6,503	100	9,035	100
TOTAL	1,870		3,310		2,663		6,135		11,916		13,963	

Source: FAO, 2015

Table 15 and Figure 15 indicate the distribution of import of sharks and rays in ASEAN region between 1990 and 2011 by country. Clearly there occurred a major change in the importer distribution where the active newcomers in the sector were Malaysia (with an import share of 25.2%, Viet Nam (15.6%) and Myanmar (4.3%). This is in contrast to the stronghold of Singapore and Thailand in 1990. The shift can be explained by the increase in demand from emerging economies like Viet Nam and Myanmar.

Table 15: ASEAN Import by Country (%), 1990-2016

Country	1990	1995	2000	2005	2010	2011
Viet Nam	0	0	0	1.1	17.6	15.6
Singapore	57.7	78.4	81.8	63.1	32.7	44.1
Thailand	39.4	15.8	10.4	5.7	5.7	7.1
Philippines	0	0.1	0.0	5.7	2.8	1.5
Malaysia	1.9	4.3	2.9	14.6	31.3	25.2
Indonesia	1.1	1.4	4.8	9.7	3.1	2.2
Myanmar	0	0	0	0	6.8	4.3
Total	100	100	100	100	100	100

Source: FAO (2015)

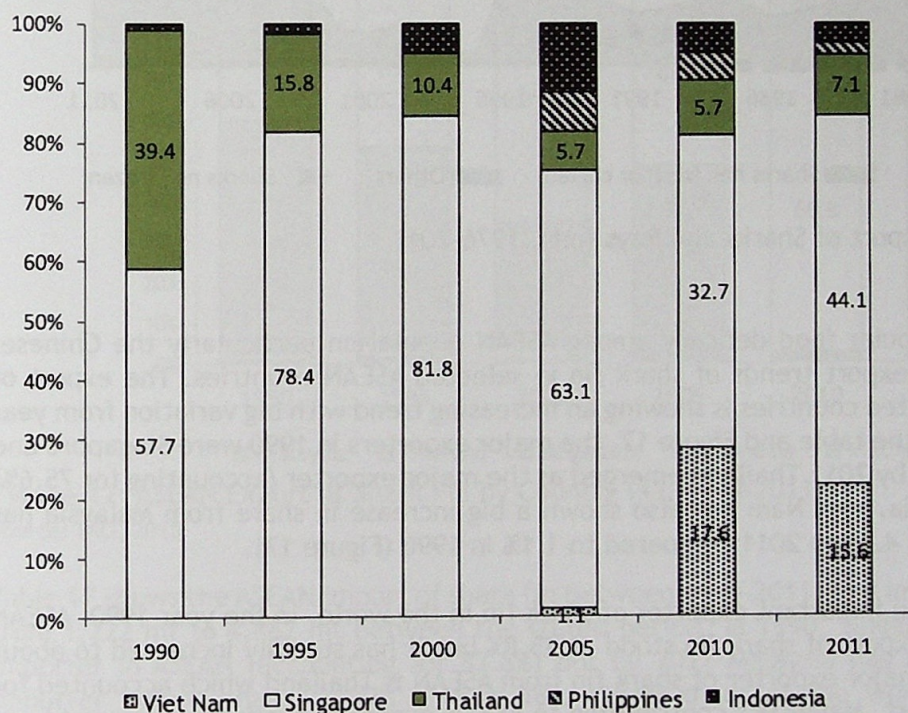


Figure 15: ASEAN Import by Country (%), 1990-2011

Source: FAO (2015)

As in the case of ASEAN export of sharks and rays, a longer perspective of ASEAN import trend (ie., from 1976 - 2011) indicate a structural change in import. Starting in 1990 the import of "Sharks nei, frozen" began to pick up and increase exponentially after 2005. This indicates an increase in shark meat consumption in the region. The shark fin meanwhile remains an important import item with an increasing trend albeit at a lower and relatively stable rate and unstable import (Figure 16).

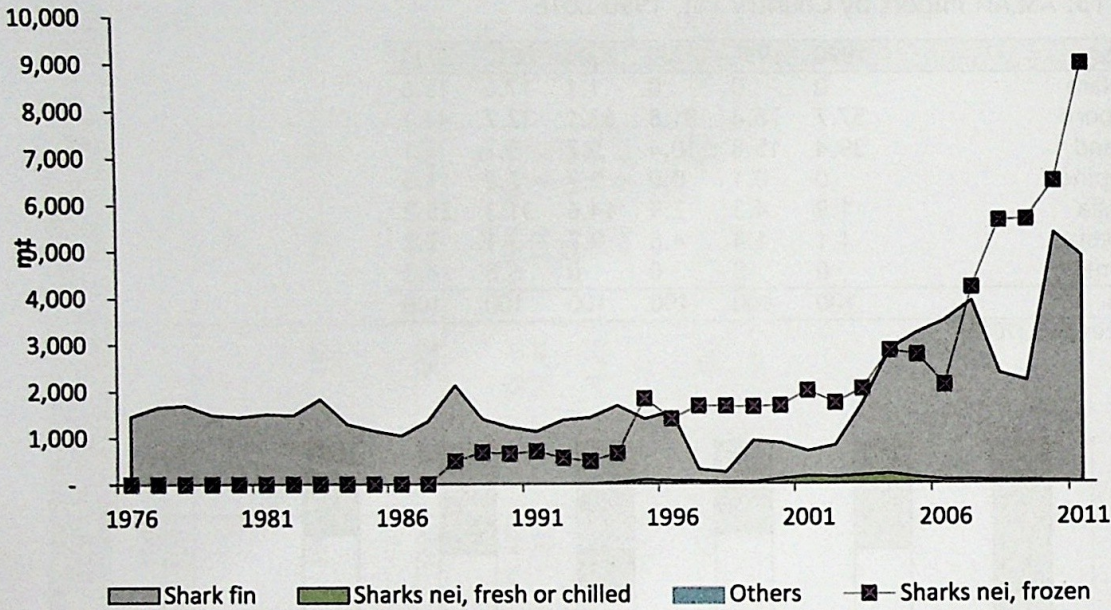


Figure 16: ASEAN Import of Sharks and Rays (mt), 1976-2011
 Source: FAO, 2015

Shark fin is very popular food delicacy among ASEAN population particularly the Chinese. Table 16 shows the export trends of shark fin in selected ASEAN countries. The export of shark fin in the selected countries is showing an increasing trend with big variation from year to year. As shown in the table and Figure 17, the major exporters in 1990 were Singapore and Indonesia. However, by 2011 Thailand emerged as the major exporter (accounting for 75.6%) followed by Indonesia. Viet Nam has also shown a big increase in share from Malaysia has increased its share to 4.1% in 2011 compared to 1.1% in 1990 (Figure 17).

ASEAN has become an important exporter of shark fin in the world. In the year 1990, ASEAN share of the world export of shark fin stood at 45.8% but it has steadily increased to about 70.3% in 2011. The major exporter of shark fin from ASEAN is Thailand which accounted for 75.6% of ASEAN export. Malaysia's contribution to ASEAN export of shark fin increased from 1.1% in 1990 to 4.1% in 2011. Its share of the world export has slowly increased from 0.5% to 2.9% within the stated period.

Table 16: ASEAN Export of Shark Fin by Country (mt), 1990-2011

Country	1990	1995	2000	2005	2010	2011
Brunei Darussalam				12		2
Malaysia	16	31	10	96	260	417
Thailand	25	61	70	44	7,141	7,723
Singapore	835	934	548	1,538	390	238
Indonesia	558	766	1,166	1,554	2,378	1,607
Viet Nam	31	142	28	228	98	223
Myanmar				2		
Philippines					35	2
Total	1,465	1,934	1,822	3,474	10,302	10,212
World	3,196	3,937	7,488	7,938	14,086	14,528
ASEAN/ WORLD (%)	45.84	49.12	24.33	43.76	73.14	70.29
Malaysia/ ASEAN (%)	1.09	1.60	0.55	2.76	2.52	4.08
Malaysia/ World (%)	0.50	0.79	0.13	1.21	1.85	2.87

Source: FAO (2015)

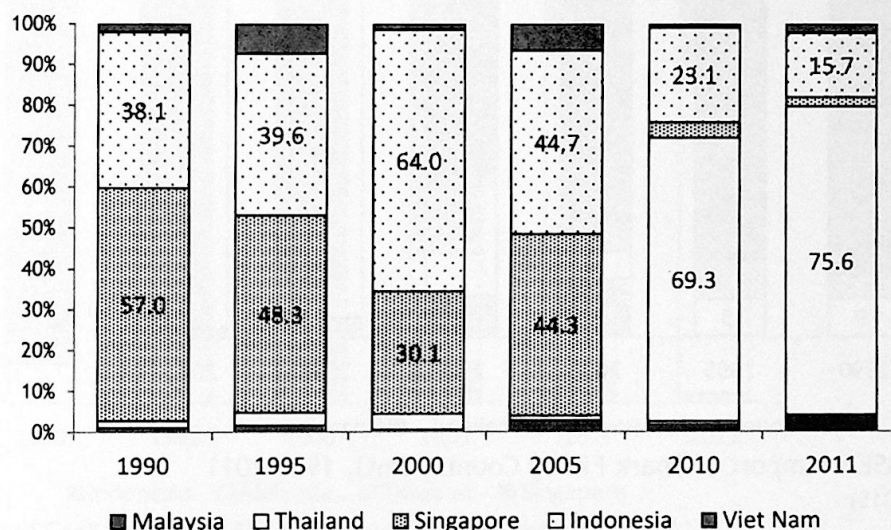


Figure 17: ASEAN Export of Shark Fin by Country (%) , 1990-2011

Source: FAO, 2015

Table 17 shows the ASEAN import of shark fin between 1990-2011. The import has quadrupled from 1,222 mt to 4,882 mt between the stated period. In 1990, Singapore was the largest importer in ASEAN (accounting for 83.8%) but by 2011 Malaysia has emerged the largest importer with a share of 72% (Figure 18). ASEAN share of the world shark fin import fluctuated around 20% between the years with a significant variability from year to year. Malaysia's has grown to be one of the world largest importer of shark fin accounting about one-fifth of the import in 2011 (compared to only 2.1% in 1990).

Table 17: ASEAN Import of Shark Fin (mt), 1990-2011

Country	1990	1995	2000	2005	2010	2011
Indonesia	1	6	127	332	237	101
Brunei Darussalam	16	-	-	-	2	-
Malaysia	114	125	57	860	3,676	3,489
Thailand	67	137	66	113	63	96
Singapore	1,024	1,127	629	1,933	591	595
Myanmar	-	-	-	-	813	601
Total	1,222	1,395	879	3,238	5,382	4,882
World	5,342	9,058	17,682	17,649	17,124	17,154
ASEAN/WORLD (%)	22.88	15.40	4.97	18.35	31.43	28.46
Malaysia/ASEAN (%)	9.33	8.96	6.48	26.56	68.30	71.47
Malaysia/World (%)	2.13	1.38	0.32	4.87	21.47	20.34

Source: FAO, 2015

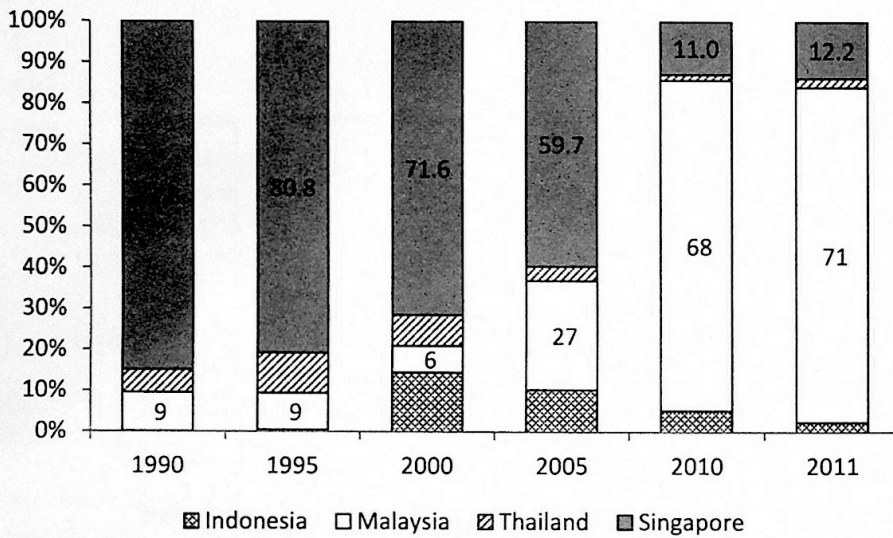


Figure 18: ASEAN Import of Shark Fin by Country (mt), 1990-2011

Source: FAO (2015)

Table 18: ASEAN Export of Shark Meat by Country (mt), 1990-2011

Country	1990	1995	2000	2005	2010	2011
Malaysia	-	33	12	10	40	6
Philippines	-	50	-	-	133	101
Viet Nam	-	19	-	35	1,791	1,920
Singapore	-	1,872	1,671	1,622	3,066	4,188
Thailand	2	21	-	33	1,015	597
Indonesia	240	8,283	147	1,209	1,915	1,367
Brunei Darussalam	-	-	-	-	-	1
Total	242	10,278	1,830	2,909	7,960	8,180
World	37,804	57,986	72,314	81,087	116,256	117,677
ASEAN/ WORLD (%)	0.64	17.72	2.53	3.59	6.85	6.95
Malaysia/ ASEAN (%)	-	0.32	0.66	0.34	0.50	0.07
Malaysia/ World (%)	-	0.06	0.02	0.01	0.03	0.01

Source: FAO (2015)

Table 19: ASEAN Import of Shark Meat by Country (mt), 1990-2011

Country	1990	1995	2000	2005	2010	2011
Viet Nam	-	-	-	66	2,098	2,170
Philippines	-	3	-	351	336	214
Indonesia	-	-	-	266	130	206
Brunei Darussalam	-	-	3	-	1	-
Singapore	-	1,486	1,550	1,941	3,304	5,556
Thailand	632	390	210	236	614	889
Malaysia	16	36	21	37	51	19
Total	648	1,915	1,784	2,897	6,534	9,054
World	45,239	53,233	85,710	106,195	123,821	121,641
ASEAN/ WORLD (%)	1.43	3.60	2.08	2.73	5.28	7.44
Malaysia/ ASEAN (%)	2.47	1.88	1.18	1.28	0.78	0.21
Malaysia/ World (%)	0.04	0.07	0.02	0.03	0.04	0.02

Source: FAO (2015)

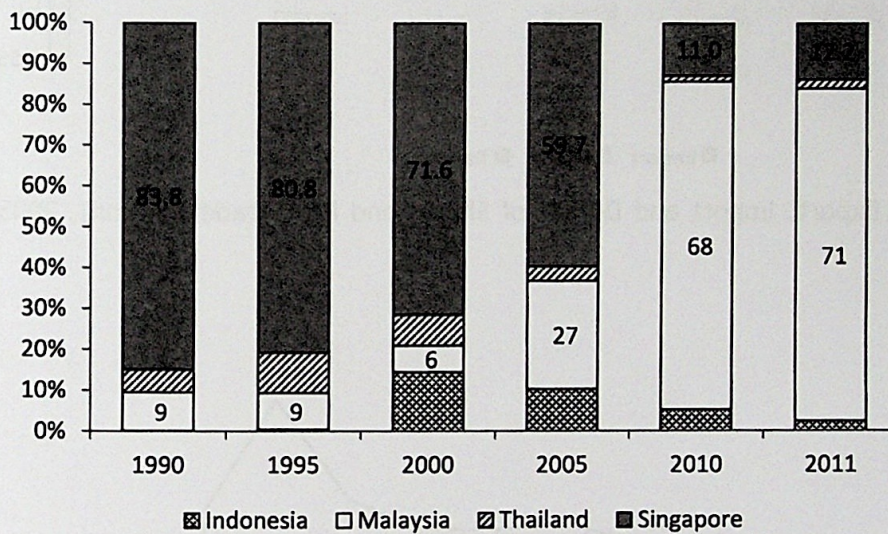


Figure 19: ASEAN Import of Shark Fin by Country (mt), 1990-2011

Source: FAO, 2015

5.3 Malaysian Market

Malaysia is a net importer of sharks and rays. Figure 20 indicates the export and import trends of sharks and rays in Malaysia. The trade of these commodities remained low between 1976 to mid 2000s. For instance, the average volume of export was 11.2 mt in the 1980s, increased to 63.1 mt (1990s) but reached 257 mt (2000-2011). Similarly the average import was 287 in the 1980s, 205.9 (1990s) and 1,225 (2000-2011). These data indicate that the import of sharks and rays is ascending at a rapid rate in the last two decades with annual growth rate of close to 100%. The export followed suit albeit at a lower rate. By 2014, the trade deficit reached 3,085 mt. The increase in import was largely due to the increase in local demand as well as for re-export.

Import value increased from RM8.15 mn in 2004 to RM17.68 mn in 2014. The import reached a high value of RM39.81 mn due to big import of “Shark’s Fins, other than in Airtight Containers” from USA amounting to RM22 mn. The export of sharks and rays show no clear trend between 2004 and 2014. However the deficit grew from RM5.2 mn in 2004 to RM36.86 in 2013 and reduced to RM11.7 in 2014 (Figure 21).

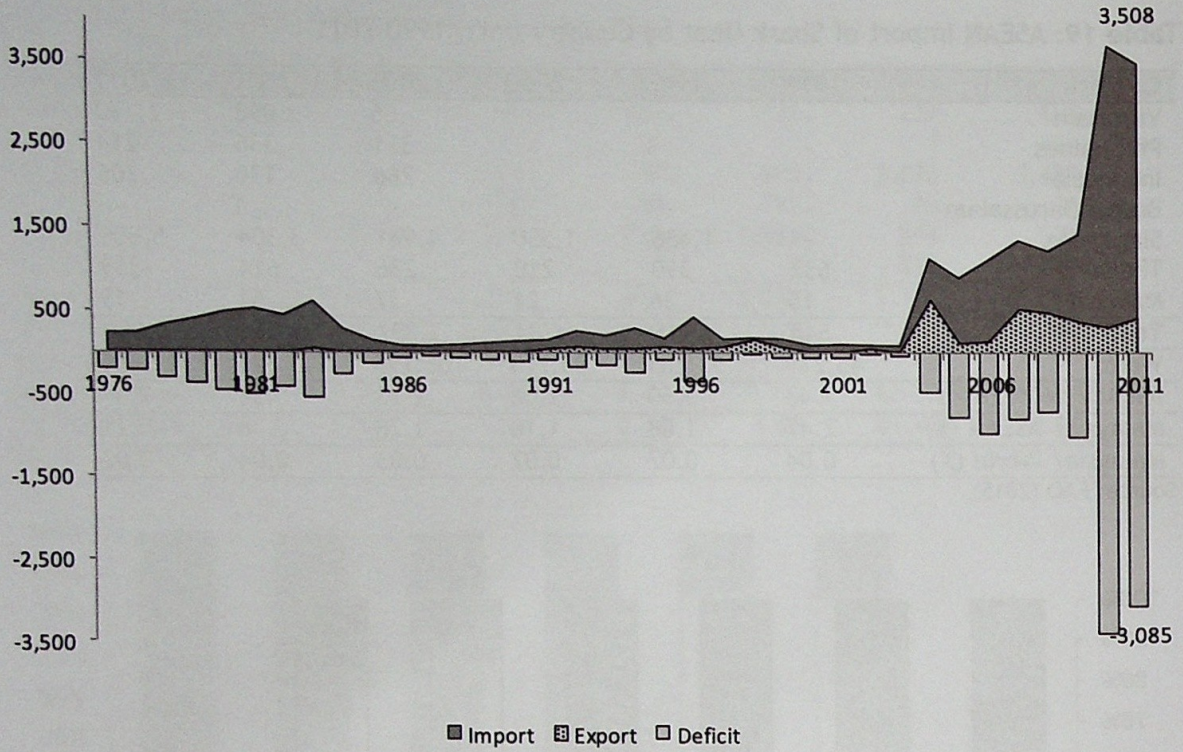


Figure 20: Malaysian Export, Import and Deficit of Sharks and Rays Trade (RM mn), 2005-2012

Source: DOFM, 2005-2012

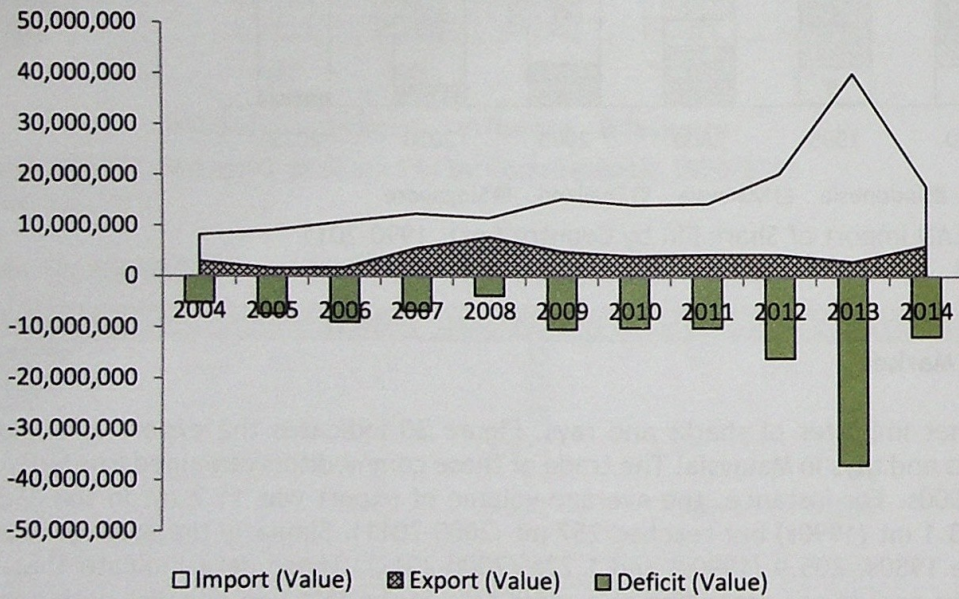


Figure 21: Malaysian Export, Import and Deficit of Sharks and Rays Trade (RM mn), 2005-2012

Source: DOFM, 2005-2012

Details of the recent Malaysian exports (2005 - 2014) are shown Table 20. The export quantity has increased by 197% from 191.1 mt in 2005 to 568.5 mt 2014. In terms of value it has increased 120% times from RM2.9 mn to RM39.8 mn (Table 21). All the product categories have increased in volume during the said period with the exception of “Shark’s Fins, Prepared or preserved, in Airtight Containers⁶”. The export volume was not stable depending on the catch at the landing centres.

⁶ This is due to the changed in classification of SITC and HS coding throughout the period of 2000-2013.

Table 20: Malaysia's Export of Sharks and Rays (mt), 2004 - 2014

Commodity	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Dogfish and other Sharks, excluding Livers and Roes, Frozen	27.93	63.20	11.2	99.43	27	32.66	39.97	6.22	5.03	0	6.6
Shark fin	14.90	8.90	42.24	19.26	30.19	30.07	38.01	38.14	12.31	17	38.3
Sharks' Fins, Prepared & Ready for Use, in Airtight Containers	84.82	4.09	60.85	174.45	243.12	261.29	146.95	233.4	132.84	237	459
Sharks' Fins, Prepared & Ready for Use, other than in Airtight Containers	55.52	3.73	15.86	171.22	25.93	0	0	0	0	53	0
Shark's Fins, Prepared or preserved, in Airtight Containers	7.97	0.00	0.83	0	159.9	55.81	14.95	26.58	53.61	0	64.7
TOTAL	191.14	79.95	131.58	464.36	486.14	379.83	239.89	304.34	203.79	307	568.5

Source: DOFM (2004-2014)

Table 21: Table Malaysia's Export of Sharks and Rays (RM), 2004 - 2014

Commodity	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Dogfish and other											
Sharks, excluding Livers and Roes, Fresh or Chilled	0	135	1,200	0	0	0	0	0	0	0	0
Dogfish and other											
Sharks, excluding Livers and Roes, Frozen	33,254	215,657	43,444	885,505	97,794	113,562	613,389	136,700	40,130	0	29,352
Shark fin	967,300	684,886	890,078	1,763,952	1,084,825	1,021,353	1,623,245	1,052,981	348,055	393,150	684,935
Sharks' Fins, Prepared & Ready for Use, in Airtight Containers	778,904	334,719	572,662	1,412,545	3,020,537	1,801,199	1,647,936	2,734,568	1,619,222	2,299,716	4,451,401
Sharks' Fins, Prepared & Ready for Use, other than in Airtight Containers	460,936	340,807	265,839	1,525,785	486,361	0	0	0	0	254,760	821,618
Shark's Fins, Prepared or preserved, in Airtight Containers	714,985	0	8,641	0	3,078,786	2,046,339	232,720	455,176	328,081		
TOTAL	2,955,379	1,576,204	1,781,864	5,587,787	7,768,303	4,982,453	4,117,290	4,379,425	2,335,488	2,947,626	5,987,306

Source: DOFM (2004-2014)

In terms of export composition, “Shark’ fins, prepared & ready for use, in airtight containers” is the highest both in volume and value. In term of quantity Figure 22 shows that in 2004 the share of this product category was only 44.4% but by 2014 it has increased to 80.7%. This indicate an expanding market for “ready to cook” shark among consumers in the import market.

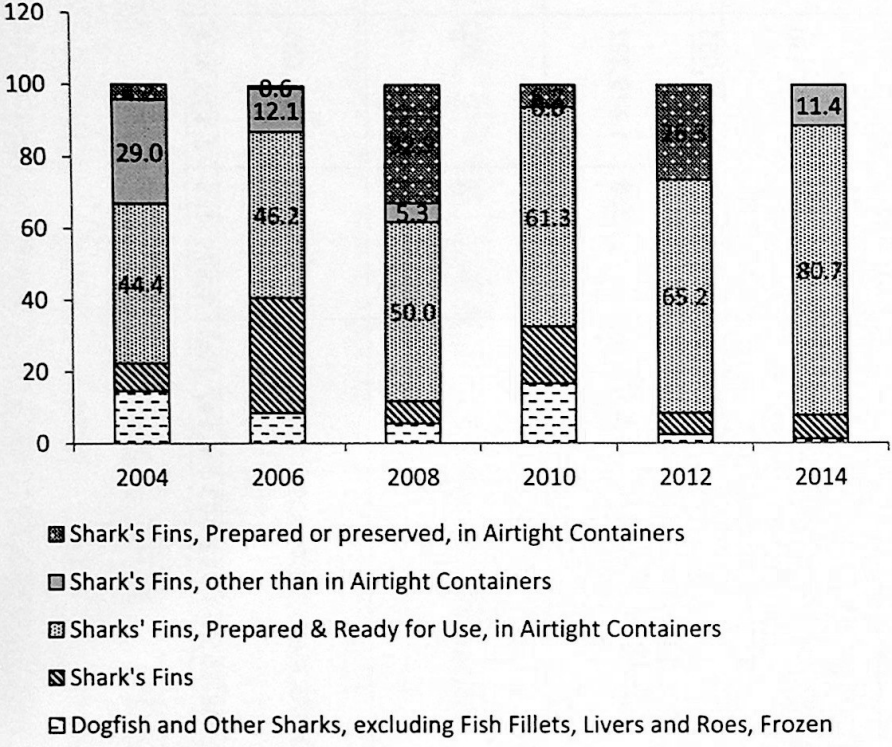


Figure 22: Malaysia’s Export Composition (%) 2004-2014
 Source: DOFM (2015)

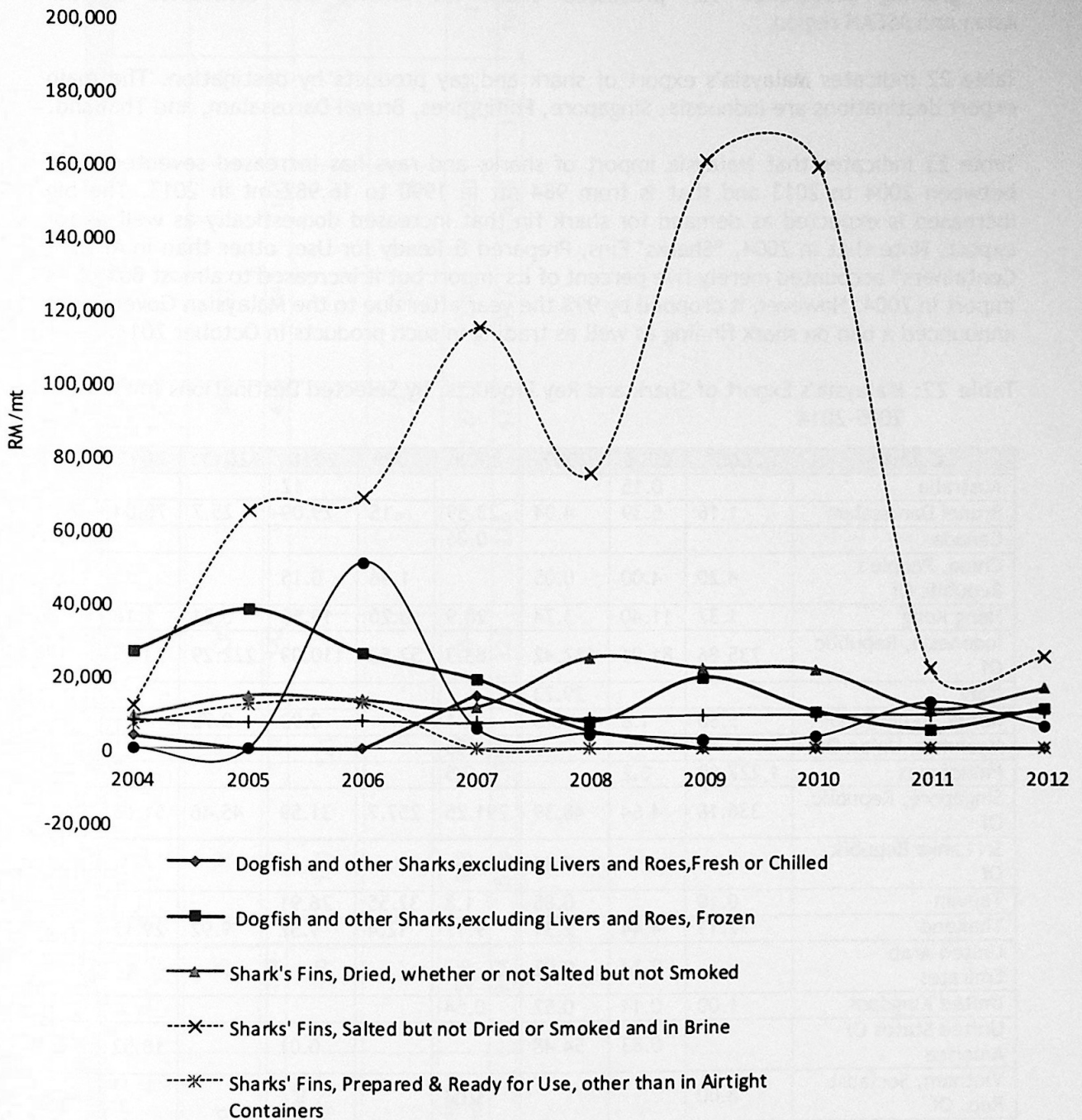


Figure 23: Average unit value of export price (RM/mt), 2004 - 2012
 Source: DOFM (2015)

Among the commodities, shark fin product fetched higher unit value. For instance, “Sharks Fins, Salted but not Dried or Smoked and in Brine” showed the highest unit value of export, followed “Sharks’ Fins, Prepared & Ready for Use, in Airtight Containers”. These data shows the growing preference for processed shark fin among the consumers in the Asian and ASEAN region.

Table 22 indicates Malaysia’s export of shark and ray products by destination. The main export destinations are Indonesia, Singapore, Philippines, Brunei Darussalam, and Thailand.

Table 23 indicates that Malaysia import of sharks and rays has increased seventeen-fold between 2004 to 2013 and that is from 984 mt in 1990 to 16,982 mt in 2013. The big increased is expected as demand for shark fin that increased domestically as well as for export. Note that in 2004, “Sharks’ Fins, Prepared & Ready for Use, other than in Airtight Containers” accounted merely five percent of its import but it increased to almost 80% of its import in 2004. However, it dropped by 99% the year after due to the Malaysian Government announced a ban on shark finning as well as trading in such products in October 2014.

Table 22: Malaysia’s Export of Shark and Ray Products, by Selected Destinations (mt), 2005-2014

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Australia		0.15				12				
Brunei Darussalam	1.16	5.39	4.04	23.59	15	29.09	25.7	70.04	36.21	54.88
Canada				0.06						
China, People's Republic Of	4.20	4.00	0.05		1.46	0.15				
Hong Kong	1.37	11.40	3.74	20.9	8.20	19.59	0.21	1.16	1.86	0.31
Indonesia, Republic Of	735.86	81.91	132.42	83.3	52.53	110.09	222.29	33.25	198	403.71
Italy			29.23							
Korea, Republic Of	5.80	1.8	8.3	3.1		0.93	0.75			2.16
Myanmar, Union Of				24.96						
Philippines	1,227.60	0.2		0.5						
Singapore, Republic Of	336.18	4.64	48.39	291.25	257.7	31.59	45.46	51.68	64.58	89.02
Sri Lanka Republic Of			8.81							
Taiwan	0.10		0.85	1.8	32.55	26.91				6.6
Thailand	77.13	4.44	2.31	9.17	12.4	9.52	9.92	29.12	6.69	12.2
United Arab Emirates		0.24	0.02							
United Kingdom	1.00	0.14	0.52	0.54						
United States Of America		0.83	54.48			0.01		18.52		
Vietnam, Socialist Rep. Of	8.00			1.04						

Source: DOFM (2005-2014)

Table 23: Malaysia's Import of Sharks and Rays (mt), 2004-2014

Commodity	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Dogfish and other Sharks, excluding Livers and Roes, Fresh or Chilled	-	-	-	1	0	-	-	-	-	41	3
Dogfish and other Sharks, excluding Livers and Roes, Frozen	36	33	52	130	29	94	52	19	67	-	53
Shark fins	164	82	121	142	43	49	44	161	71	67	57
Sharks' Fins, Prepared & Ready for Use, other than in Airtight Containers	99	169	121	-	-	-	-	-	-	15,097	77
Sharks' Fins, Prepared or preserved, in Airtight Containers	-	-	0	1	3	9	31	2	21	237	0
Sharks' Fins, Prepared & Ready for Use, in Airtight Containers	586	593	760	1,054	1,150	1,273	1,270	1,270	1,802	1,540	1,444
Total	984	876	1,053	1,328	1,226	1,425	1,397	1,453	1,962	16,982	1,634

Source: DOFM (2015)

Table 24: Malaysia's Import of Sharks (RM) 2004- 2014

Commodity	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Dogfish and other Sharks, excluding Livers and Roes, Fresh or Chilled	364,455			14,787	350						
Dogfish and other Sharks, excluding Livers and Roes, Frozen	958,326	1,272,117	1,354,370	2,481,319	213,126	1,857,038	525,649	103,413	753,967		456,433
Shark fin	1,491,309	1,245,636	2,033,732	2,260,628	1,654,084	1,730,534	1,723,126	2,334,122	1,403,030	393,150	1,032,306
Sharks' Fins, Prepared & Ready for Use, other than in Airtight Containers	678,138	2,107,099	1,528,039							254,760	23,059,984
Sharks' Fins, Prepared or preserved, in Airtight Containers			6,651	7,200	13,714	23,448	98,546	26,525	130,923	2,299,716	15,261,033
Sharks' Fins, Prepared & Ready for Use, in Airtight Containers	4,659,404	4,387,918	5,825,699	7,549,805	9,635,529	11,673,762	11,760,755	11,886,225	17,977,986		
Total	8,151,632	9,012,770	10,748,491	12,313,739	11,516,803	15,284,782	14,108,076	14,350,285	20,265,906	2,947,626	39,809,756

Source: DOFM (2015)

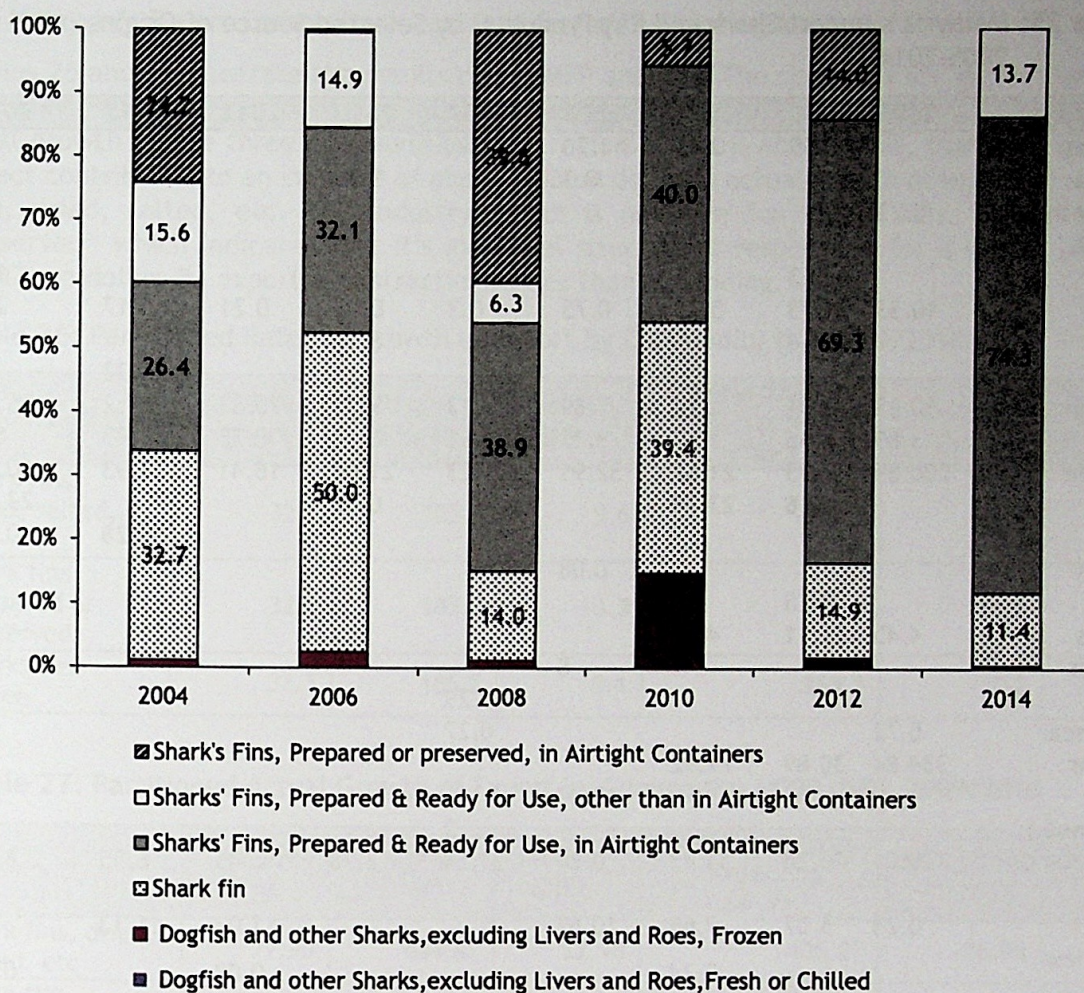


Figure 24: Malaysia's Import Composition of Shark and Ray Products (%), 2004-2012
 Source: DOFM (2015)

Malaysia's import of sharks of rays is also skewed toward a similar product category that is "Sharks' fins, prepared and ready for use, in airtight containers". The export:import ratio of this product in 2014 was 0.29 indicating that Malaysia imports more than export of this item. The share of this product in 2004 was about 35.4% but it has increased 78.2% in 2014. The major source of import was Thailand reaching 96% in 2014 (worth RM15.6 mn compared to RM4.4 mn of export). Based on the data, most of this product (70%) is consumed locally as in 2014, about RM 4.4 mn or 29% was exported from a total of RM14.9 mn imported. The rough average of import price of this product is estimated at RM10,796 per mt in 2014. However the export price to Brunei was higher at RM16,993 per mt suggesting there is some value added activities being carried out on the imported product. Similarly export to Singapore was priced at RM8,703 per mt and Indonesia at RM8,291 per mt.

Table 25: Malaysia's Import Shark and Ray Products, by Selected Source of Origins (mt), 2005-2014

Country	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Argentina		0.59	0.42	1.76						
Australia				0.3		1.36				
Bangladesh	0.23									
Brunei D.										
Chile		0.3							1.5	
China	10.33	21.73	5.29	0.75	0.2	0.03	0.21	0.17	2.1	19.74
Ghana						8.17				
Guinea								0.32		
Hong Kong	0.83	3.91	6.24	7.89	13	9.71	79.82	34.2	36.07	53.59
India	3.89	8.66	10.7	9.87	3.61	8.16	2.78	3.93	8.3	3.1
Indonesia	200.85	7.93	21.67	52.91	241.23	21.06	16.41	11.93	10.76	39.92
Japan		0.6	23.74			0.02			23.93	
Korea								50.28	0.48	
Lebanon				0.08						
Macau		0.28								
Maldives	4.45	11.11	4.83							
Mauritius				8						
Mexico					0.29					
Madagascar	0.72				0.27					
Myanmar	334.84	30.89	71.92							14.32
Nambia				10.03						
Netherland					2					
New Zealand	30.01	26.24	34.43	0.21	21.54	2.78	2.45	6.55	8.19	0.6
Norway										0.61
Pakistan	0.24	5.07	0.66	10.62			17.02	11.13		
Papua New Guinea			0.24				0.08		0.08	
Philippines	9.75	14.27	12.65	7.27	11.94	7.19	14.41	15.87	16.27	12.71
Seychelles		3.48								
Singapore	5.14	18.51	63.46	2.98	16.6	42.24	2.08	15.26	11.65	28.01
South Africa			2.25							
Spain		11	0.38		20.17				5.14	25.57
Sri Lanka	0.38	0.55	0.55		0.49		1.64			
Taiwan		8.18	0.2			19.1	0.71	7	0.93	
Thailand	15,786.63	751.91	1,044.89	1,064.86	1,050.26	1,199.64	1,236.55	1,757.86	1,473.56	1,397.9
Viet Nam	30.88	18.1	10.51	47.99	31.16	77.28	78.46	47.97	65.79	35.19
USA	0.96	0.13	0.59		12.7				15081	
TOTAL	6,420.13	943.44	1,315.62	1,225.52	1,425.46	1,396.74	1,452.62	1,962.47	16,745.75	1,631.26

Source: DOFM (2005-2014)

5.4 Malaysia's Export Competitiveness: Multifactor Partitioning Analysis

Tables 26 and 27 illustrate the results of the MFP analysis. The commodities' growth rate is attributed to five components, as illustrated earlier. ASEAN effect contributes 32.5% to the total growth of the three commodities. The region effect is about 185%, that is, regional effect contributed to an increase of about 0.45mn dollar in actual growth of export of shark fins, dried, salted, etc. The industry effect is negative for "Shark fins, prepared or preserved" which indicates that it's industrial structure is responsible for a loss of about 0.147 mn dollar. Its export is contracting rather than expanding.

Table 26: Partitioned Rates of Growth of Export by Commodity (%), 2009/2010

Commodity	ASEAN Effect	Region Effect	Industry Effect	Region-Industry Interaction Effect	Allocation Effect	Total
Shark fins, dried, salted, etc	32.5	185.2	9.6	-169.3	-11.2	46.8
Shark fins, prepared or preserved	32.5	185.2	-13.3	-181.3	-11.2	11.8
Sharks nei, frozen	32.5	185.2	9.1	263.3	-11.2	478.8

Table 27: Partitioned Actual Growth of Export by Commodity ('000 USD), 2009/2010

Commodity	ASEAN Effect	Region Effect	Industry Effect	Region-Industry Interaction Effect	Allocation Effect	Total
Shark fins, dried, salted, etc	77.90	444.47	22.98	-406.37	-26.98	112
Shark fins, prepared or preserved	358.01	2042.71	-146.47	-2000.25	-124.00	130
Sharks nei, frozen	10.71	61.11	3.00	86.89	-3.71	158

The ASEAN effect remains about the same for the following year. The region effects, however, are negative, suggesting declines in export. The export of “Shark fins, prepared or preserved” had declined by about 0.617 mn dollar over the period. The partitioned rates of growth for 2010/2011 (%) and their absolute values are presented in Tables 28 and 29.

As shown in Table 28, export growth values are calculated for each industry and comparison is made between the selected countries. As shown, both region and industry effects are negative for Malaysia. This means that growth rate of sharks export is declining in the country. In contrast, these effects are positive for Indonesia. It is worth noting that Thailand has an expanding industrial structure with about USD1.52 mn dollar increase in export (Table 30).

Table 28: Partitioned Rates of Growth of Export by Commodity (%), 2010/2011

Commodity	ASEAN Effect	Region Effect	Industry Effect	Region-Industry Interaction Effect	Allocation Effect	Total
Shark fins, dried, salted, etc	32.7	-50	-35.5	-31.5	-12.5	-96.9
Shark fins, prepared or preserved	32.7	-50	4.9	82.8	-12.5	57.9
Sharks nei, frozen	32.7	-50	14.3	-61	-12.5	-76.4

Table 29: Partitioned Actual Growth of Export by Commodity ('000 USD), 2010/2011

Commodity	ASEAN Effect	Region Effect	Industry Effect	Region-Industry Interaction Effect	Allocation Effect	Total
Shark fins, dried, salted, etc	114.97	-176.02	-125.04	-111.01	-43.89	-341
Shark fins, prepared or preserved	402.71	-616.56	60.59	1021.01	-153.76	714
Sharks nei, frozen	62.38	-95.51	27.38	-116.43	-23.82	-146

Table 30: Industry Growth of Export by Country ('000 USD), 2010/2010

Country	ASEAN Effect	Region Effect	Industry Effect	Region-Industry Interaction Effect	Allocation Effect	Total
Malaysia	580.07	-888.08	-37.08	793.57	-221.47	227
Indonesia	884.80	469.14	253.87	26.01	-337.82	1,296
Singapore	19,604.00	8,155.35	-1,740.26	4,748.76	-7,484.85	23,283
Thailand	11,091.14	-7,736.40	1,523.47	6,710.41	-4,234.62	7,354

5.5 Competitiveness: Relative Trade Advantage

Table 31 provides the results of the relative trade advantage (RTA) calculation. The interpretation of the RTA ratios is as follow:

- $RTA < 0$ Refers to all those product groups with an absence of relative trade advantage or to products with relative trade disadvantage.
- $RTA = 0$ Refers to all those product groups at a break-even point without relative trade advantage or relative trade disadvantage.
- $RTA > 0$ Refers to all those product groups with a relative trade advantage.

In 2011, the Revealed Export Advantage for Malaysia or RXA are $0.04 < 1$ and $0.02 < 1$ for “Shark fins, dried, salted, etc.” and “Shark fins, prepared or preserved”, respectively (Table 31). This indicates that Malaysia has no relative export advantage for these commodities. The index for “Shark fins, prepared or preserved” is $63.96 > 1$ suggesting a relative export advantage. However, these results will be more insightful if they are compared to import figure. The net export indices suggest that there is no relative trade advantage for the two commodities mentioned earlier as Malaysia imports more of these products than it exports. The trade advantage of “Sharks nei, frozen” is not significant as it is very close to zero. The findings indicate that Thailand has a strong relative trade advantage in “Shark fins, prepared or preserved”.

Table 31: Revealed Trade Advantage Index of Selected Countries, 2009-2011

Country/Products	2009	2010	2011
MALAYSIA			
<i>Export</i>			
Shark fins, dried, salted, etc.	0.92	0.90	0.04
Shark fins, prepared or preserved	5.99	3.80	63.96
Sharks nei, frozen	0.04	0.17	0.02
<i>Import</i>			
Shark fins, dried, salted, etc.	0.15	0.03	0.06
Shark fins, prepared or preserved	18.24	203.61	326.95
Sharks nei, frozen	0.15	0.02	0.00
Net Export			
Shark fins, dried, salted, etc.	0.77	0.87	-0.02
Shark fins, prepared or preserved	-12.25	-199.81	-262.99
Sharks nei, frozen	-0.12	0.16	0.02
INDONESIA			
<i>Export</i>			
Shark fins, dried, salted, etc.	0.00	0.00	0.00
Shark fins, prepared or preserved	5.12	1.85	2.01
Sharks nei, frozen	0.43	1.33	0.87

Table 29: Cont'd.

Country/Products	2009	2010	2011
INDONESIA			
<i>Import</i>			
Shark fins, dried, salted, etc.	0.00	0.00	0.00
Shark fins, prepared or preserved	1.73	0.90	0.00
Sharks nei, frozen	2.28	4.91	Inf
<i>Net Export</i>			
Shark fins, dried, salted, etc.	0.00	0.00	0.00
Shark fins, prepared or preserved	3.40	0.95	2.01
Sharks nei, frozen	-1.85	-3.57	-
SINGAPORE			
<i>Export</i>			
Shark fins, dried, salted, etc.	12.50	18.24	18.41
Shark fins, prepared or preserved	0.01	0.01	0.00
Sharks nei, frozen	22.49	19.71	45.79
<i>Import</i>			
Shark fins, dried, salted, etc.	3.18	9.18	4.43
Shark fins, prepared or preserved	0.17	0.04	0.05
Sharks nei, frozen	2.34	5.14	6.61
<i>Net Export</i>			
Shark fins, dried, salted, etc.	9.32	9.06	13.99
Shark fins, prepared or preserved	-0.16	-0.04	-0.04
Sharks nei, frozen	20.15	14.57	39.17
THAILAND			
<i>Export</i>			
Shark fins, dried, salted, etc.	0.08	0.04	0.07
Shark fins, prepared or preserved	69.48	161.17	250.71
Sharks nei, frozen	0.04	0.03	0.01
<i>Import</i>			
Shark fins, dried, salted, etc.	1.24	1.27	1.32
Shark fins, prepared or preserved	0.24	0.17	0.27
Sharks nei, frozen	1.59	1.69	1.32
<i>Net Export</i>			
Shark fins, dried, salted, etc.	-1.16	-1.23	-1.26
Shark fins, prepared or preserved	69.24	161.00	250.43
Sharks nei, frozen	-1.55	-1.66	-1.31

5.6 Summary

The deliberations above indicate that trade in sharks and rays has intensified in volume and value in the last two decades particularly shark fin. Total trade (export plus import) increased from 91,580 mn mt to 270,716 mt between 1990 to 2011 indicating an increase of 195.6%. The increase was driven by fundamental factors, supply and demand. On the supply side, improvement in the capture technology has encouraged industrial and artisanal fleets from all over the world to supply shark fin and meat to meet increasing demand. On the other hand, globalisation has brought growth particularly to the Asian region particularly China and Viet Nam who are world largest consumers of shark fin.

Among the product categories, the shark fin trade registered rapid growth compared to shark meat in terms of value. According to FAO, between 2000 to 2011, the yearly average import of shark fin was 16, 815 mt per year. In 2011, the total declared value of world exports was USD438.6 for 17 154 mt imported. On the other hand the value of world imports of shark meat were USD380 mn for 121 641 mt. The relatively high unit value of trade of shark fin is a cultural phenomenon in that the demand for fin is high among Chinese consumers particularly in Asian region. The retail price of fin is among the highest in the seafood category. The economic improvement of these countries has triggered higher demand for this delicacy among the high income consumers.

The market for shark fin and meat is distinct. The world major shark producers generally export both commodity types, but there is less overlap between importers. For instance, shark fin is destined for consumers in a concentrated market comprising eastern and south east Asean countries such as China, Hong Kong, Taiwan, Singapore, Malaysia and Viet Nam. On the other hand, the world largest consumers of shark meat are found in Brazil, Uruguay, Spain and Korea.

Fin exporters cover both primary producers such as Indonesia and Spain. China and Hong Kong which are active world fin traders are not fin producers but they are world major importers cum exporters. Singapore is also another world active trader in shark fin.

China and Taiwan produce significant volume of sharks domestically in addition to consuming, importing, processing and trading (export and re-export). The world largest shark meat exporters are Spain, Indonesia, Taiwan and Japan. The growth of shark meat was driven by demand for seafood when the potential for increased production for alternative wild marine fish stocks is limited. It was also triggered by finning regulation that require shark carcasses be landed together with their fin at 5% fin to carcass weight ratio hence prompting the development of markets in which the meat can be sold. Large producers are Spain, Taiwan in addition to their roles as suppliers to the shark fin market. They export shark meat to major markets in Italy, Brazil and Uruguay.

Asian and ASEAN are becoming a major force in the world shark fin trade. In terms of export, Asian accounted for 88.8% of the world export. Among Asian countries ASEAN export contributed about 78% to the Asian export. Similarly, in the import sector, Asian held almost all the import (96.2%). About 28% of Asian import came from ASEAN region particularly Malaysia (71%). Hence Malaysia is an active importer of shark fin ASEAN.

As for ASEAN sharks and rays trade, the trading nations has shifted from concentration on two major traders (Singapore and Thailand) towards a more diversified market. The emerging trading nations are: Viet Nam, Indonesia, Malaysia and Myanmar. Besides shark fin, the next popular item being traded was "Sharks' Fins, Prepared & Ready for Use, in Airtight Containers" which indicate the consumer preference for this fish.

Malaysia is a net importer of sharks and rays product and the deficit is growing as demand for shark meat and fin is rising due to improvement in income and changing life style. The major portion of her export are mainly “Shark’s Fins, Prepared & Ready for Use, in Airtight Containers” (80.7%). Major export destinations are Singapore, Indonesia, Hong Kong and other ASEAN countries. A similar pattern is observed in Malaysia’s import pattern where the same item is a major component of import (74.3%) in 2014. In fact Malaysia is the largest importer of shark fin in ASEAN region. Malaysia imported cheaper shark fin and reexport this item at a higher price after some value addition activities. The MPF and RTA analyses merely confirm that the increase in the Malaysian export is partially attributed to the increase in trade growth in the region and Malaysia appears to have some competitive advantage in the shark fin export.

6. Marketing of Shark and Ray Products

Based on the focus group discussions with major actors in the marketing of sharks and rays in selected areas in Sabah, the general marketing channel for sharks and rays is depicted in Figure 25. Sharks traders in Sabah bought fish directly from the fishers and the sharks are sold either locally or exported to Peninsular Malaysia, Thailand, Hong Kong, Singapore, and few others. Shark products were mainly in the form of salted and dried fin, frozen shark meat, and fish ball. Many Malaysian shark fin traders had multiple roles. They fished, processed, and sold the products to the local market all at the same time. However, shark meat was usually delivered to wholesalers.

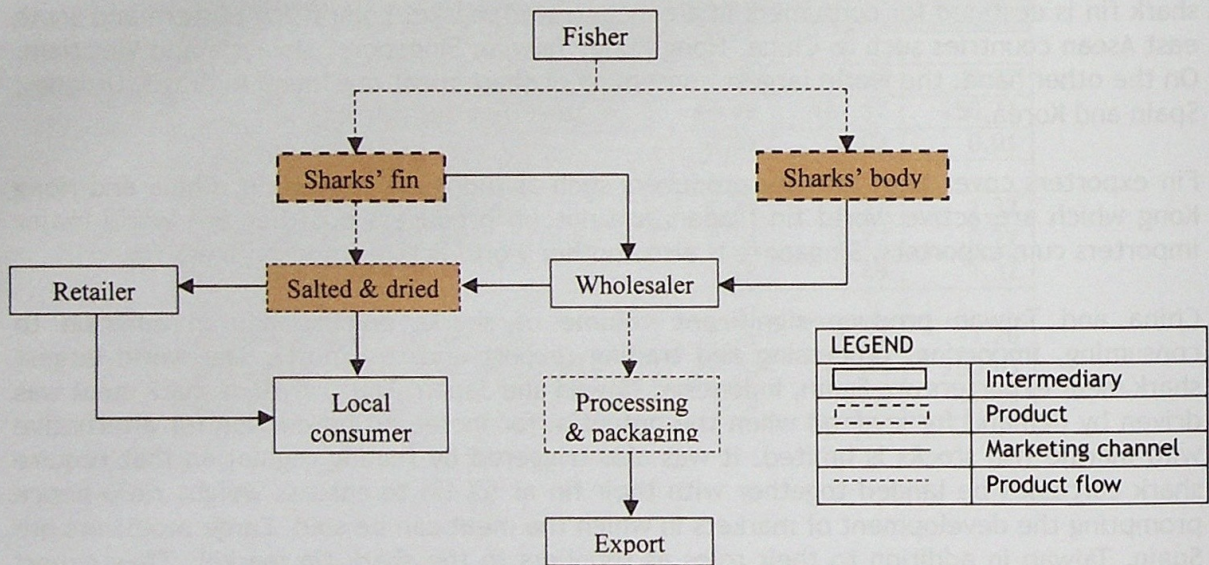


Figure 25: Sharks Marketing Channel in Sabah, Malaysia

The following paragraphs describe case studies on marketing channel of sharks and rays by areas as well as specific entities (fisher-cum-exporters). The selected areas were: Kota Kinabalu, Sandakan and Semporna. The specific entities referred to two companies that were involved in both the fishing as well as exporting activities located in Sandakan and Semporna.

6.1 Case 1: Marketing Channels of Sharks in Kota Kinabalu, Sabah as at 14 September 2015

The marketing practices and channels of sharks at Kota Kinabalu are presented in Figure 26. The study has observed the landing of sharks at the landing complex provided by the Sabah Fish Marketing Authority (SAFMA) in Kota Kinabalu. It was reported that sharks are also brought to other private jetties nearby i.e., fish market jetty. Unlike tuna and marlin where they were traded on contractual basis between the fisher and buyer, sharks were sold openly to traders. Prices were determined by the buyers (who are largely wholesalers) and they varied according to species, size and grade. Transactions were mainly made in cash.

The major sharks species caught were hammerhead shark (*Sphyrna lewini*), bamboo shark (*Chiloscyllium punctatum* and *C. plagiosum*) and sport-tail shark (*Carcharhinus sorrah*). The landing prices for each species were RM4.50/kg, RM4/kg and RM2.50/kg respectively. The whole body of sharks and rays were sold to a single wholesaler (first level) who offered high price irrespective of volume. For instance, hammerhead shark and sport-tail shark were sold at RM5/kg. The separation of the body parts were done either at the landing centre, wet markets, or factories.

The body parts were sold at the landing centres (stalls owned by the fishers) as well as to other wholesalers (second level) and local restaurants. Some of the wholesalers (second level) processed the shark body parts at the landing centres to produce fish balls and small cuts.

According to Abdul Haris Hilmi et al., (2017, in press), the highest sharks species landing by weight at SAFMA Jetty were brownbanded bambooshark (*Chiloscyllium punctatum*) followed by whitespotted bambooshark (*C. plagiosum*), sport-tail shark (*Carcharhinus sorrah*), scalloped hammerhead shark (*Sphyrna lewini*), and coral catshark (*Atelomycterus marmoratus*). During our trip we found whitetip reef shark (*Triaenodon obesus*), bamboo sharks (*Chiloscyllium* spp), sport-tail shark (*Carcharhinus sorrah*) and scalloped hammerheadshark (*Sphyrna lewini*). The landing prices varied by species. For instance, a relatively big size sharks from family Carcharhinidae such as sport-tail shark and scalloped hammerhead shark were sold at RM2.50/kg to RM3.50/kg. Almost all sharks and rays were sold to a single wholesaler. Fins were sold separately. Processing for big size sharks to small cuts was carried out at the jetty by the wholersaler. A whole body of small size shark such as scalloped hammerhead shark and sport-tail shark were sold at RM3.5-RM4.5/kg. The body parts were sold to other retailers at nearby fish markets, traders and local restaurants.

Sometimes, the traders outsourced sharks from fishers to produce sharks cuts and fish ball. The left over body parts were also processed into animal food (pellet) by a fishmeal factory. The left-over meat was sold at RM0.40/kg and while heads and other parts of the body were priced at RM0.15/kg. Clearly almost all parts were fully utilised.

The prices however doubled or even tripled once it reached the fish market. For example, spot-tail and bamboo sharks were sold at RM2.5 to RM3.5/kg at SAFMA jetty before were sold at RM4.50 to RM5.50/kg at nearby Kota Kinabalu fish market.

The sharks fin marketing channel differs from its body parts. To further enhance the value added of the fin, the fishers dry and salt the fin for about two to three weeks. They also source fins from other fishers. The dried and salted fins are stored in sacks. Each sack weighs 15 kg and it takes two to three months to fill up one. The price of per sack is between RM1,200 to RM1,300 sold to Chinese medicinal shops locally.

Study conducted by Abdul Haris Hilmi et al., (2017, in press) reported that in term of weight, the highest landing by species for rays at SAFMA Jetty were bluespotted stingray (*Neotrygon kuhlii*) followed by whitespotted whipray (*Himantura gerrardi*), sharpnose stingray (*Dasyatis zugei*) and narrow tail stingray (*Pastinachus gracilicaudus*). During our visit, we observed that the ray species that were sold at the landing area were eagle ray (*Aetobatus ocellatus*), leopard whipray (*Himantura leoparda*), reticulated whipray (*Himantura uarnak*), honeycomb whipray (*Himantura undulata*), narrow tail stingray (*Pastinachus gracilicaudus*), starrynose stingray (*Pastinachus stellurostris*) and bluespotted stingray (*Neotrygon kuhlii*).

The price range for big size eagle ray and leopard whipray (whole body) sold to the first level wholesalers was RM1.50 - RM2.50/kg while small size bluespotted stingray could reach to RM4/kg. The price of small size reticulated whipray was RM5/kg. Processing of big size rays to small pieces (about 10 cm width) such as leopard whipray, reticulated whipray, eagle ray and narrow tail stingray were carried out at the jetty by the wholesaler. The wholesales price at jetty ranged from RM3.5 to RM4.5/kg. The prices were eventually more than doubled once sold at the fish market. Skins for big size rays species such as leopard whipray, reticulated whipray, and narrow tail stingray and starrynose stingray also have commercial value.

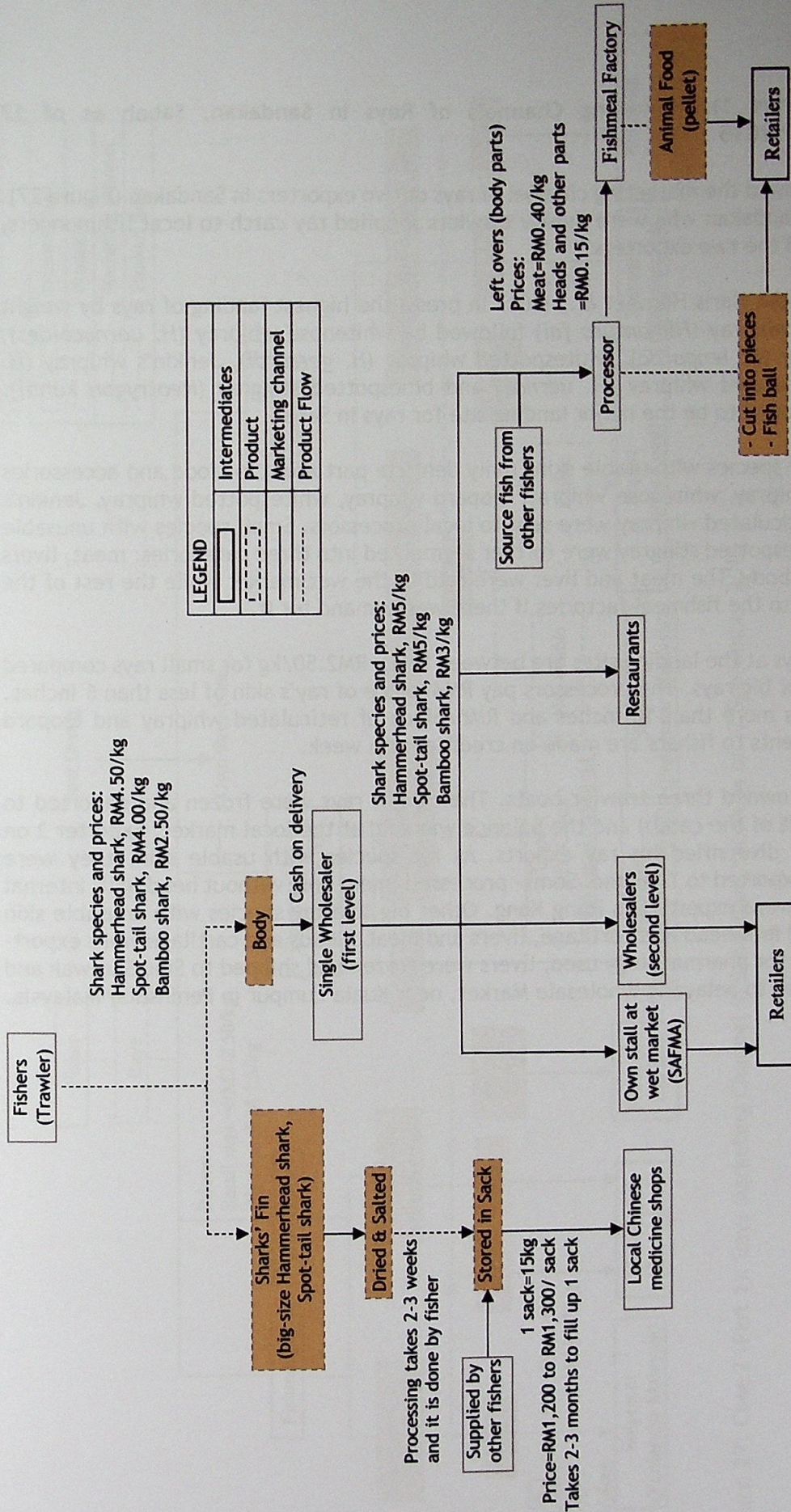


Figure 26: Case 1: Marketing Channels of Sharks in Kota Kinabalu, Sabah as at 14 September 2015

6.2 Case 2 (Part 1): Marketing Channels of Rays in Sandakan, Sabah as of 17 September 2015

The study examined the marketing channel of rays of two exporters in Sandakan (Figure 27). The fishers in Sandakan who were mostly trawlers supplied ray catch to local fishmongers, wholesalers and the two exporters.

According to Abdul Haris Hilmi *et al.*, (2017 in press) the highest landing of rays by weight was from pink whipray (*Himantura fai*) followed by whitenose whipray (*H. uarnacoides*), leopard whipray (*H. leoparda*), whitespotted whipray (*H. gerrardi*), Jenkin's whipray (*H. jenkinsii*), reticulated whipray (*H. uarnak*) and bluespotted stingray (*Neotrygon kuhlii*). Sandakan was found to be the major landing site for rays in Sabah.

The big size ray species with usable skins (only denticle part area) for food and accessories such as pink whipray, whitenose whipray, leopard whipray, whitespotted whipray, Jenkin's whipray and reticulated whipray were sent to local processors. Small species with unusable skin such as bluespotted stingray were further segmented into three categories: meat, livers and rest of the body. The meat and liver were sold to the wet market while the rest of the body were sold to the fishmeal factories if there was demand for it.

The prices of rays at the landing sites are between RM2 - RM2.50/kg for small rays compared to RM1.50/kg for big rays. The processors pay RM4/piece of ray's skin of less than 6 inches, RM6/kg for rays more than 10 inches and RM6/piece of reticulated whipray and leopard whiprays. Payments to fishers are made on credit once a week.

The Exporter 1 owned three trawler boats. The caught rays were frozen and exported to China (about 90% of the catch) and the balance was sold at the local market. Exporter 2 on the other hand diversified his ray exports. As for species with usable skin, they were processed and exported to Thailand. Semi - processed (meat only without head, gill, internal organ and tail) were exported to Hong Kong. Other big size ray species with unusable skin were segmented into head and cartilage, livers and meat. Heads and cartilage were exported to Hong Kong for pharmacology used, livers were frozen and shipped to Sibu Sarawak and meat was shipped to Selayang Wholesale Market, near Kuala Lumpur in Peninsular Malaysia.

6.2 Case 2 (Part 2): Sharks Marketing Channel in Sandakan, Sabah as of 17 September 2015

Figure 28 indicates the sharks marketing channel in Sandakan. In total there were five known marine product factories and two wholesalers who were involved in sharks and rays exports. According to Abdul Haris Hilmi et al., (2007, in press), the highest landing of shark species was brownbanded bambooshark (*Chiloscyllium punctatum*) followed by spot-tail shark (*Carcharhinus sorrah*), zebra shark (*Stegostoma fasciatum*), bull shark (*Carcharhinus leucas*), and whitespotted bambooshark (*Chiloscyllium plagiosum*).

At the landing site, the fishers sold whole body of sharks with all fins attached to either wholesalers or fishmongers at RM2/kg regardless of size. The price however varied according to the weather, moon position and season. The buyers seemed to have the power to decide on price. The wholesalers sold at RM5.50/kg to retailers. Retailers normally salted the fish before selling them to the consumers. The consumers may be able to buy at RM5/kg if they buy direct from the fishmonger at the landing site. The fishers cut the body parts into pieces at the landing site. Fins were sent to the Sandakan market nearby.

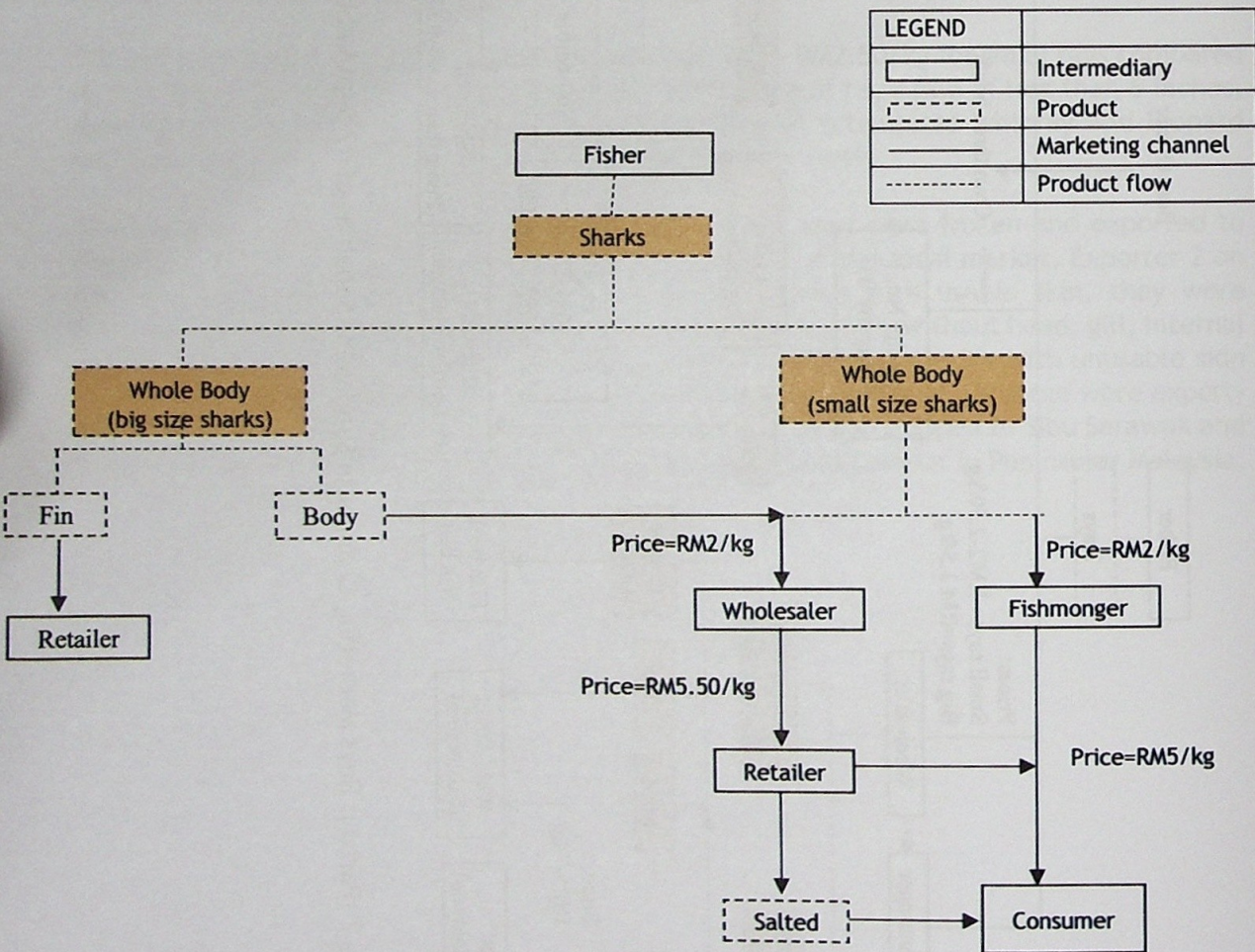


Figure 28: Case 2 (Part 2): Sharks Marketing Channel in Sandakan, Sabah as of 17 September 2015

6.3 Case 3: Sharks and Ray Marketing Channel of Company A, Sandakan, Sabah as 17 September 2015

Figure 29 illustrates the case of marketing practices and channel of sharks and rays of a company (herewith named as Company A) in Sandakan. An examination of this company's marketing practices provides insights as to the value added activities as well as logistic of sharks and rays exports. This company sourced rays and sharks from the local fishers as well as processing factories from Indonesia. The share of foreign sources was estimated to be about half of the total.

The company did the processing and the products were exported to Hong Kong. As for rays catch, the company sorted them into edible skin, non-edible skin, cartilage, and meat. The edible skin, and cartilage were exported to Hong Kong.

Ray skin was processed to produce dried ray skin. The dried skin was sent to designated agent in Peninsular Malaysia then transported to Thailand using land transport for further processing.

The containers weighed two mt each and with a capacity of carrying 4,000-5,000 pieces of ray's skin per container. The marketing cost was estimated at RM8,000 to RM9,000 per trip and the shipping cost to China is RM3,000/container.

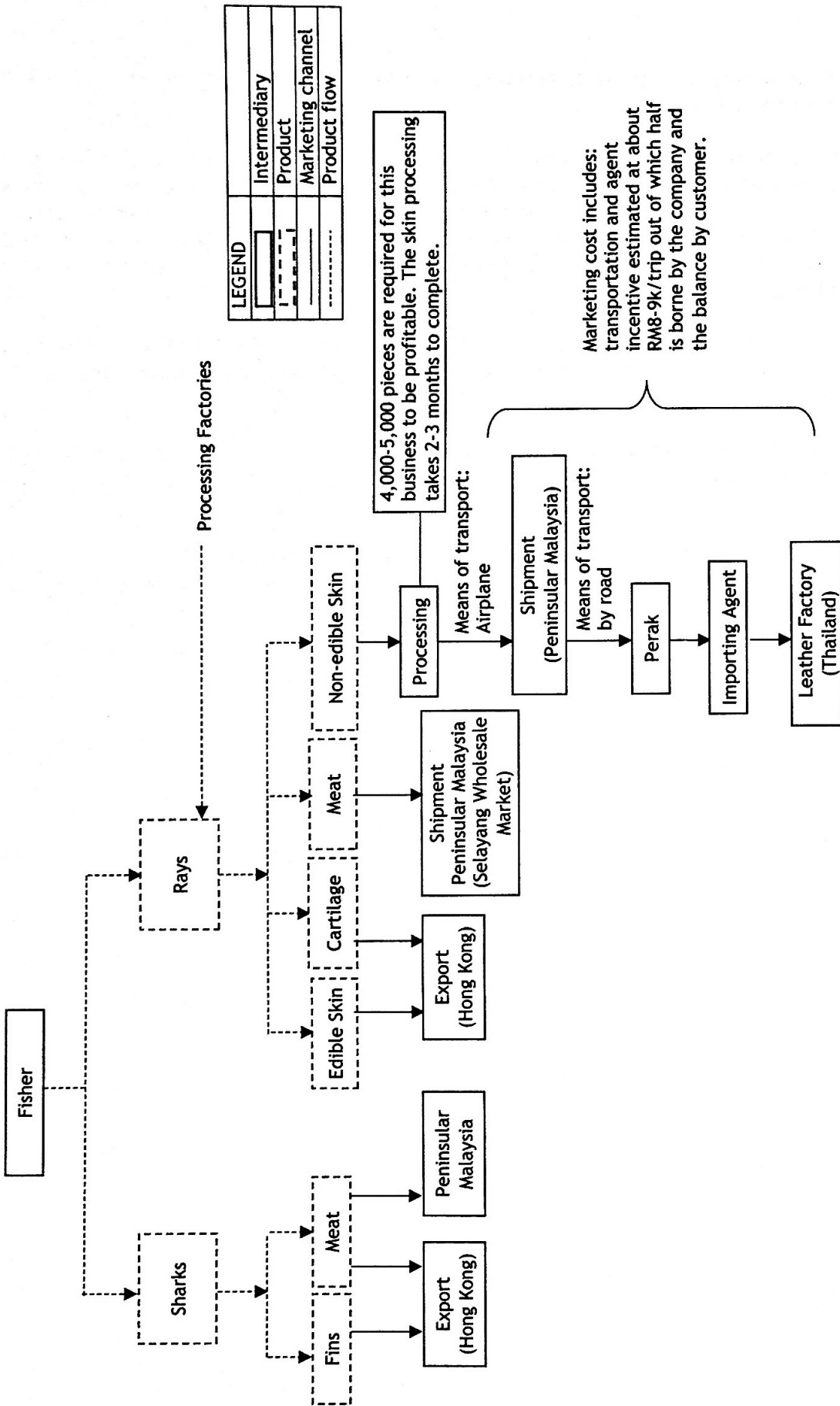


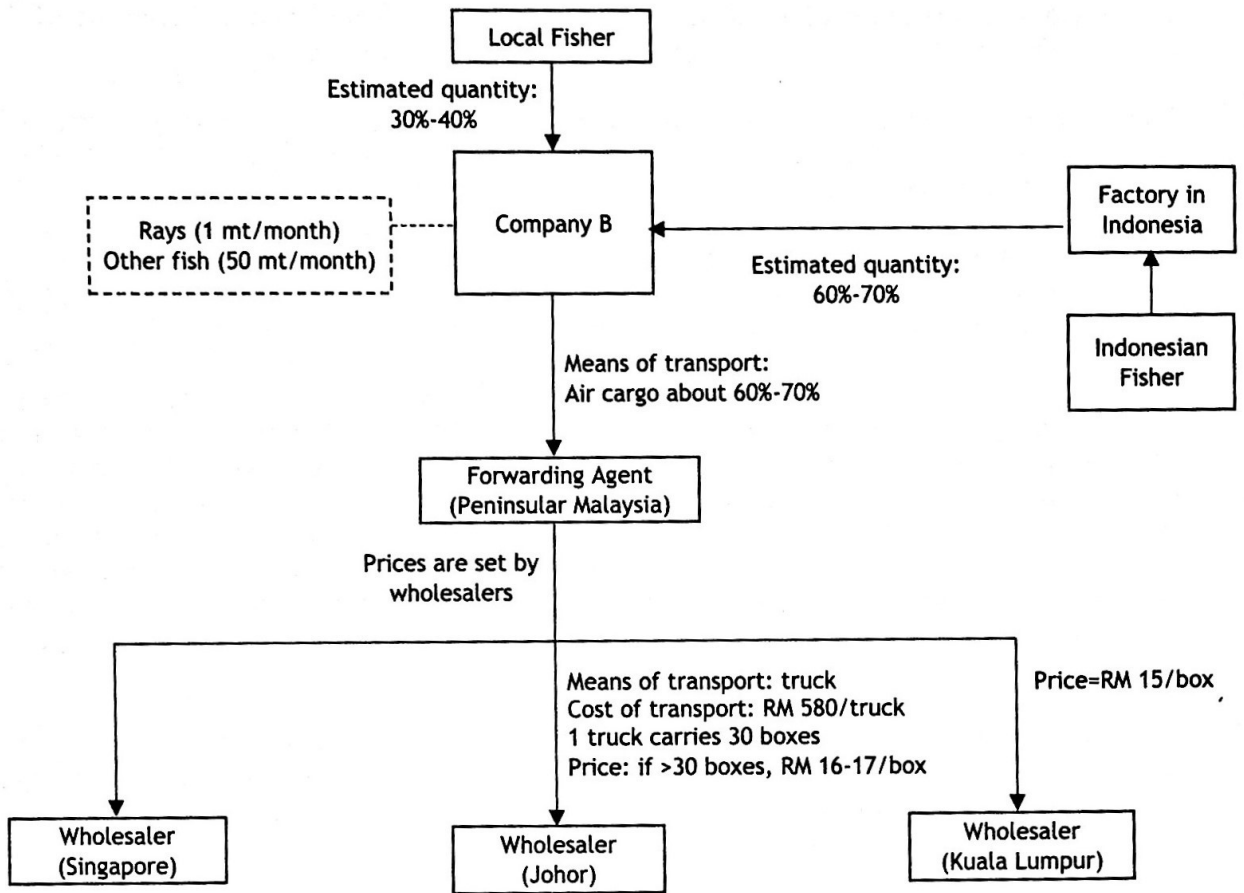
Figure 29: Case 3: Sharks and Ray Marketing Channel of Company A, Sandakan, Sabah as 17 September 2015

6.4 Case 4: Marketing Channel of Rays of Company B in Tawau, Sabah as of 21 September 2015

The study examined further the marketing practices and channel of another company in Tawau (herewith called as Company B). Company B was involved in a variety of fish with a small quantity of rays (Figure 30). The company sourced its fish from local fishermen (between 30-40%) and from a factory, Tarakan Island, Indonesia. On average the company received fish from two vessels daily. The study observed there was no contractual arrangement between the fishers and the company. The company handled about 50 mt per month of fish of which consisted one mt of rays.

The major types of fish traded were red snapper, groupers, threadfin, mackerels, white prawn, and tiger prawn. As for rays, the company sold them fresh with minimal processing and the company bought at RM2.30 per kg. The fishes and rays were transported to market centres by the forwarding agents outside of Tawau through planes (about 70% are transported through an airline) to major airports such Senai Airport in Johor Bahru and Kuala Lumpur International Airport 2 (KLIA2) in Peninsular Malaysia as well as Changi Airport in Singapore. In Peninsular Malaysia, the distributions of fish were carried out using trucks where the transportation cost was RM580 per truck and each truck carried on average 30 styrofoam boxes.

The prices received by the company were decided through negotiation with the buyer at the landing sites as well those at the wholesale markets outside Tawau. The marketing cost of the shipment was borne equally by the company and the buyer.



LEGEND	
	Intermediary
	Product
—————	Marketing channel
- - - - -	Product flow

Figure 30: Rays Case 4 Marketing Channel of Rays of Company B in Tawau, Sabah as at 21 September 2015

6.5 Case 5: Marketing Channel of Sharks of Company C, Semporna, Sabah as of 19 September 2015

The following paragraphs provide the marketing channel of sharks as practiced by Company C. Based on our observation, the fishermen at Semporna sold their sharks catch to collecting agents of wholesalers at the landing site. The fishers were paid cash upon delivery. The prices varied according to sizes. For instance, the price of fin of 15 inches was RM80/set, RM130/set (18 inches) and RM20/set for fins that were less than 15 inches. Fishers' selling prices for hammerhead sharks were in accordance to its size where RM10/set was charged for 9 inches hammerhead, RM20/set (10 inches), RM30/set (11 inches), RM40/set (12 inches), RM50/set (13 inches) and RM80/set (14 inches). The skin from head area fetches RM6/kg (good market in Semporna for this part of the sharks) because of the local demand which used the skin part for local signature cuisines. At the landing site, the hammerhead shark meat was sold at RM2.00-RM2.50/slice while the wholesale price reaches RM3/slice. The prices were largely set by the retailers (Figure 31).

From Semporna the fish was transported by road to retailers in Sandakan, Tawau, and Semporna local market. The total ground transport cost to Sandakan is RM490/trip where the fuel cost alone amounting to RM160/trip. The company makes a profit margin of RM0.50/kg. Sales were paid largely in cash. The total ground transport cost to Tawau was RM200/trip.

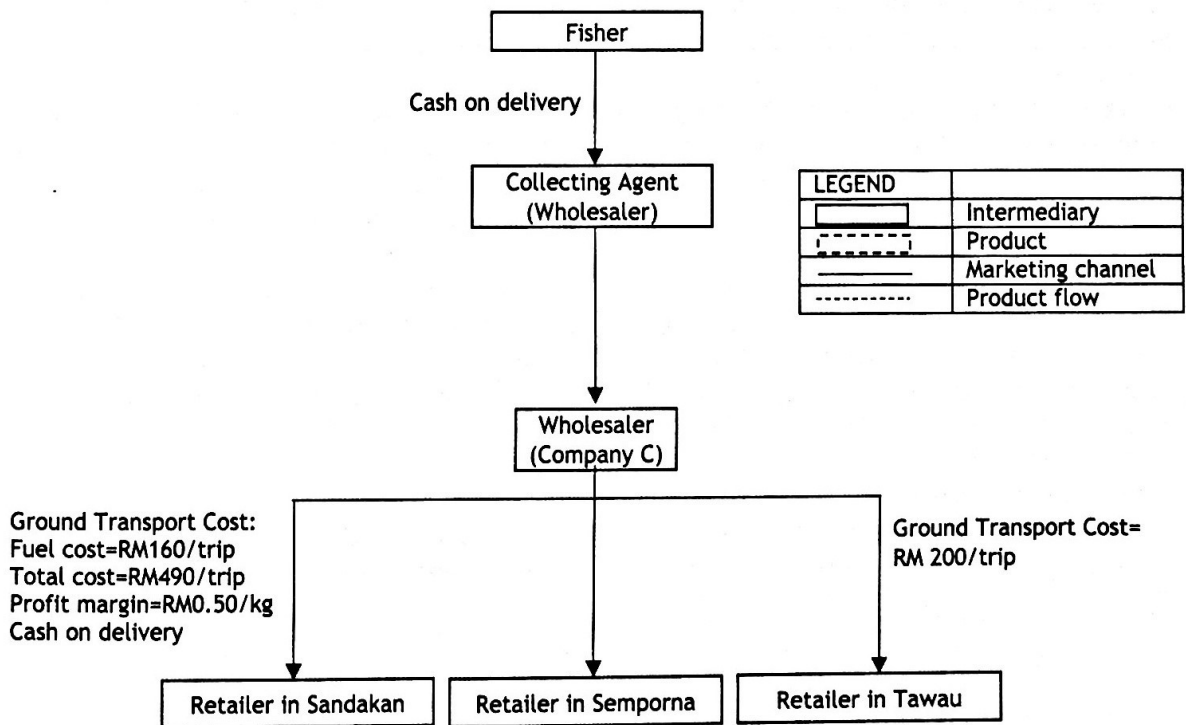


Figure 31: Case 5: Shark Marketing Channel in Semporna, Sabah as 19 September 2015

6.6 Summary

The study has gathered data on the marketing channels and practices of sharks and rays in selected areas in Kota Kinabalu, Sandakan, Tawau and Semporna. Based on the discussions, a number of observations can be concluded.

Firstly, the marketing channels were highly localised depending on the catch (volume and type) and local demand. The key industry players (wholesalers, processors, retailers, exporters, and consumers) were local people. Due to the unique properties of the shark and ray products, its marketing system was run by a wide range of intermediaries including: fishers, wholesalers, retailers (incl. those specialising in medicinal products), restaurants, exporters/importers and consumers.

Secondly, the diversity of products and value added created indicate high degree of utilisation of shark carcass by the fishers and traders. For instance, in Kota Kinabalu, the form of consumption of sharks by local consumers were in various forms (including medicinal purposes).

Thirdly, it is observed that in all centres, the shark and ray products were consumed locally as well as for export. Shark and ray products were traded in the world market particularly in the Asian market such as Hong Kong, Singapore and Thailand (only skin). The traders seemed to have its own unique of marketing network within and outside Malaysia. Major domestic market destinations include Sibul, Johor Bahru and Kuala Lumpur.

Fourthly, the shark and ray upstream product development was active in which fishers and processors were able to add value to fresh catch by various product transformations through drying, salting, packaging, and processing both for human and animal consumption. However, the downstream product development requires further research and development.

Fifthly, the traders were able to perform marketing function efficiently despite the location disadvantage. Therefore the state of infrastructural facilities require a lot more improvement to minimize transaction cost. With highly efficient transportation network, the products were able to fulfill the demand in Peninsular Malaysia which lessened the import volume from other countries.

Finally, along with the active domestic marketing and trade which were contributing to livelihood and socio-economics of the local communities, their practices reflect the sustainability and optimal utilisation of natural marine resources.

7. Conclusion

This study aims to examine the domestic marketing of sharks and rays in Sabah and the international trade of Malaysia's sharks and rays. As for the trade, the study focusses on the shark trade pattern globally and in ASEAN and the role of Malaysia besides measuring the country's export competitiveness using MFP and RTA analyses. As for the domestic marketing of sharks and rays in Sabah, the aspects examined include; the major players in the system, marketing channels and practices. In short, the study addresses the extent of commoditization and commercialization of these two important categories of fish that are listed the country's NPOA. It is hoped that the findings would provide the evidential input for policy decision and action.

The discussion on the world trade of sharks and rays indicate a number developments that are impacting the performance of the Malaysian sharks and rays industry. First, the trade volume of sharks and rays has experienced a rapid increase in the last two decades after a slow growth in the 1980s and 1990s. Between 1990 and 2011 the quantum of trade has increased threefold. The increase was driven by fundamental factors, supply and demand. On the supply side, improvement in the capture technology has encouraged industrial and artisanal fleets from all over the world to supply shark fin and meat to meet increasing demand. On the other hand, globalisation has brought growth particularly to the Asian region particularly China and Viet Nam who are among the world largest consumers of shark fin.

Among the product categories, the shark fin trade registered rapid growth compared to shark meat in terms of value. The unit trade value of shark fin is relatively higher than the shark meat. The cause for the high value of shark fin is rooted to cultural and dietary habits of the Asian consumers particularly the Chinese who are largely located in the Asian region. In the last two decade the world saw the emergence of active exporters and importers of shark fin from China as well as ASEAN countries particularly Malaysia, Viet Nam and Myanmar. The increase in demand for shark fin in the Asian and ASEAN region was partly responsible in promoting growth export and import of this commodity. The retail price of fin is among the highest in the world under seafood category.

The world market for shark fin and meat is distinct. The world major shark producers generally export both commodity types, but there is less overlap between importers. For instance, shark fin is destined for consumers in a concentrated market comprising eastern and South East Asian countries such as China, Hong Kong, Taiwan, Singapore, Malaysia and Viet Nam. On the other hand, the world largest consumers of shark meat are found in Brazil, Uruguay, Spain and Korea.

Fin exporters cover both primary producers such as Indonesia and Spain. China and Hong Kong which are active world fin traders are not fin producers but they are world major importers cum exporters. Singapore is also another world active trader in shark fin.

China and Taiwan produce significant volume of sharks domestically in addition to consuming, importing, processing and trading (export and re-export). The world largest shark meat exporters are Spain, Indonesia, Taiwan and Japan. The growth of shark meat was driven by demand for seafood when the potential for increased production for alternative wild marine fish stocks is limited. It was also triggered by finning regulation that require shark carcasses be landed together with their fin at 5% fin to carcass weight ratio hence prompting the development of markets in which the meat can be sold. Large producers are Spain, Taiwan in addition to their roles as suppliers to the shark fin market. They export shark meat to major markets in Italy, Brazil and Uruguay.

Asian and ASEAN are becoming a major force in the world shark fin trade. In terms of export, Asian accounted for 88.8% of the world export. Among Asian countries ASEAN export contributed about 78% to the Asian export. Similarly, in the import sector, Asian held almost all the import (96.2%). About 28% of Asian import came from ASEAN region particularly Malaysia (71%). Hence Malaysia is an active importer of shark fin ASEAN.

As for ASEAN sharks and rays trade, the trading nations has shifted from a concentration on two major traders (Singapore and Thailand) towards a more diversified market. The emerging trading nations are: Viet Nam, Indonesia, Malaysia and Myanmar. The import pattern clearly indicates the growing demand for “Shark Fins” as well “Sharks’ Fins, Prepared & Ready for Use, in Airtight Containers” which indicate the consumer preference for this specific products.

Malaysia is a net importer of sharks and rays and the deficit is growing as demand for shark meat and fin is rising due to improvement in income and changing life style. The major portion of Malaysia’s are mainly “Shark’s Fins, Prepared & Ready for Use, in Airtight Containers” (80.7% in 2011). Malaysia also exports this product to countries like Singapore, Indonesia, Hong Kong and other ASEAN countries. A similar pattern is observed in Malaysia’s import pattern where the same item is a major component of import (74.3%) in 2014. In fact Malaysia is the largest importer of shark fin in ASEAN region. Malaysia imported cheaper shark fin and reexport this item at a higher price after some value addition activities. On the world scale, Malaysia’s participation in the sharks and rays trade is still small with the exception of shark fin import where Malaysia ranked second after Hong Kong as the world largest importer.

The MPF and RTA analyses merely confirm that the increase in the Malaysian export is partially attributed to the increase in trade growth in the region and Malaysia appears to have some competitive advantage in the shark fin export respectively.

The observation on the domestic marketing of sharks and rays in selected areas in Sabah suggest that the industry is responding to the market forces pretty well despite the location disadvantage. The growing demand in neighbouring countries particularly China is being disseminated through various media to the industry participants. Based on the findings of the KIS and FGDs, a number of observations can be concluded. First, considering that the products were “by-catch” which were irregular in term of harvest and size, its marketing system can be considered relatively efficient. The following observations support this contention. Second, the marketing channels were highly localised depending on the catch (volume and type) and local demand. For instance, in Kota Kinabalu, sharks were consumed by local consumers in various forms (including medicinal purposes). Some centres such as Sandakan, Tawau and Semporna, sharks and rays were either consumed locally or exported particularly for shark fin and large size sharks. Third, sharks and rays were traded in the world market particularly in the Asian region such as Hong Kong, Singapore and Thailand. China was the final destination for some products particularly shark fin that were exported to Hong Kong. Fourth, the traders seemed to have a good marketing network within and outside Malaysia. Popular export destinations were: Thailand, Singapore, Hong Kong and China. Major internal market destinations include Sibu, Johor Bharu and Selayang. Fifth, the sharks and rays product development was active in that fishers and traders were able to add value to their catch by various product transformations through drying, packaging and processing both for food and non-food purposes. The diversity of products and value added created indicate high degree of utilisation of shark carcasses by the fishers, processors and traders. Sixth, the traders were able to perform marketing function efficiently despite the location disadvantage and infrastructural defects particularly at the landing centres. This indicates that the need for logistical upgrading to minimize transaction costs. Seventh, due to the

unique properties of the shark and ray products, its marketing system was run by a wide range of intermediaries including: fishers, wholesalers, retailers (incl. those specialising in medicinal products), restaurants, exporters/importers and consumers. In short, the fundamentals for sharks and rays were relatively strong particularly the demand sector. The uniqueness of shark fin which is revered by Chinese consumers at large explains for its very high market value and hence incentives for the supply sector. The supply sector on the other hand may not be able to respond as fast as the demand and in fact it requires monitoring to ensure sustainability. The finning regulation has prompted the market for shark meat all over the world which minimizes wastage. Clearly interventions aimed at conservation will have to balance the trilogy of the market, resources and environment in a sustainable manner.

REFERENCE

- Ahmad, A. and Lim, APK (2012). Field Guide to Sharks of the Southeast Asian Region SEAFDEC/MFRDMD/SP/18. 210pp.
- Ahmad, A. and Lim, APK, Fahmi, Dharmadi, Tassapon Krajangdara (2014). Field Guide to Rays, Skates and Chimaeras of the Southeast Asian Region SEAFDEC/MFRDMD/SP/25. 289pp.
- Ahmad Ali (2014). Kajian Ikan Yu dan Kajian Sosio-ekonomi Nelayan di Semporna, Sabah.
- Ahmad Ali (2011). Implementation of the National Plan of Action for Conservation and Management of Shark Resources (reported in BOBLME 2011).
- BOBLME (2011). Report of the BOBLME Sharks Working Group. 5-7 July 2011, Male, Maldives.
- Bojnec, S. & Ferto, I. (2009). Agro-food trade competitiveness of Central European and Balkan countries. *Food Policy*, 34, 417-425.
- Clarke, Shelley and Felix Dent (2014). State of the Global Market for Shark Commodities. Twenty-seventh Meeting of the Animals Committee. Veracruz, Mexico, 28th April - 3 May, 2014. CITES AC27 Inf 14.
- Department of Fisheries Malaysia (2005-2012). Annual Fisheries Statistics [Volume 2].
- Department of Fisheries Malaysia (2006). Malaysia National Plan of Action for the Conservation and Management of Shark (Malaysia NPOA - Shark), Ministry of Agriculture and Agro-based Industry Malaysia. Putrajaya. 66 pp.
- Department of Fisheries Malaysia (2006). Malaysia National Plan of Action for the Conservation and Management of Shark (Malaysia NPOA - Shark), Department of Fisheries, Ministry of Agriculture and Agro-based Industry Malaysia. Putrajaya. 66 pp.
- Department of Fisheries Malaysia (2014). Malaysia National Plan of Action for the Conservation and Management of Shark (Plan 2), Department of Fisheries, Ministry of Agriculture and Agro-based Industry Malaysia. Putrajaya. 58 pp.
- FishStatJ FAO (2015). Fishery and Aquaculture Statistics. [Global commodities production and trade 1976-2011].
- Lack, Mary and Glenn Sant (2012). An Overview of Shark Utilisation in the Coral Triangle Region. TRAFFIC and WWF 52pp.
- Lack, Mary and Glenn Sant (2011). The Future of Sharks: A Review of Action and Inaction. TRAFFIC International and the Pew Environmental Group 41pp.
- Lamarque, R. H., Srinath, K. P., & Ray, D. M. (2003). Correct Partitioning of Regional Growth Rates: Improvements in Shift-Share Theory. *Canadian Journal of Regional Science*, 26(1), 121.
- Lafay, G. (1992). The measurement of revealed comparative advantages. in: Dagenais M.g., Plunet P-A. (eds.): international Trade Modelling. Chapman & Hall, London, pp. 209-236.

- SEAFDEC (2006). Report on the Study on Shark Production, Utilization and Management in the ASEAN Region 2003-2004. SEC/SP/75 SEAFDEC, Bangkok, Thailand 229pp.
- Ray, M. (1990). Standardising employment growth rates of foreign multinationals and domestic firms in Canada: from shift-share to multifactor partitioning (No. 62). International Labour Organization.
- Ray, D. M., Lamarche, R. H., & Biffignandi, S. (2011). The Geography of Employment Growth in Western Canada: A Regional Typology based on Multifactor Partitioning.
- Ray, D. M., Lamarche, R. H., & Beaudin, M. (2012). Economic growth and restructuring in Canada's heartland and hinterland: From shift-share to multifactor partitioning. *The Canadian Geographer/Le Géographe canadien*, 56(3), 296-317.

Appendix I: List of Stakeholders and Activities

No.	Date	Stakeholder	Notes	Activity
1	1/7/2015	Mr. Sadik bin Ebu	Persatuan Penjaja Bumiputera Pantai Barat Sabah	Key Informant Survey
2	2/7/2015	Trader	Inflamega Sdn. Bhd	
3	3/7/2015	Mr. Chin Vui Jye	Widegrowth Marine Products Sdn. Bhd.	
4	3/7/2015	Mr. Chia Ming Kuang	Kwong Lee Trading	
5	4/7/2015	Kampung Selamat market (wet and dry market)	Trader, Kampung Selamat market	
6	4/7/2015	Mr. Choi Vin Zek	Manfong Cold Storage	
7	5/7/2015	Mr. Dhamar	Fisher, SEAFEST jetty, Semporna	
8	6/7/2015	Mrs. Ani (manages the buying of fish landed at Pangkalan Batu 3.5)	Rays landing centre, Batu 3.5, Tawau	
9	6/7/2015	Mrs. Liaw Nyuk Yan	Hoi Seng Sea (Rays procesing plants, Jalan Ampat, Tawau)	
10	6/7/2015	A trader at the wet market	Trader, dried fish, Tanjung Market, Tawau	
12	14/9/2015	Mdm. Saliah & Mr. Rudhi	Lembaga Kemajuan Ikan Sabah and PNK, Kota Kinabalu	Focus Group Discussion
13	15/9/2015	Mr. Sadik bin Ebu and Mdm. Elina	Wholesalers for sharks and rays, SAFMA jetty, Kota Kinabalu	
14	15/9/2015	Mr. Chia	Fishers (trawler), Kota Kinabalu	
15	15/9/2015	Mr. George Fan Wai Keong	Manager/Tawkey, trawler, SAFMA jetty, Kota Kinabalu.	
16	17/9/2015	Mr. Aidar (Edi)	Wholesaler for sharks and rays, wet market, Sandakan	
17	17/9/2015	Mdm. Chin Vui Jye & Mr. Nicholas Jok	Widegrowth Marine Products Sdn. Bhd, Sandakan	
18	17/9/2015	Mr. Chia Ming Kuang	Kilang Kwong Lee Trading, Sandakan	
19	17/9/2015	Messrs. Chiang Gik Huat, Cheah Hwa Heng, Ang Ying Kiong & Koh Vui Lip	Fishers (trawls), Sandakan	
20	17/9/2015	Messrs. Sarip Abd Kadir (Drift Net), Yahya bin Adip (Hooks and lines) & Effendy Mustapha (Longlines)	Traditional fishers, Sandakan Sabah	
21	18/9/2015	Mr. Cat Cassidy	Scuba Junkie, Semporna	
22	19/9/2015	Messrs. Mubin b. Parajah (Chairman, JKKNP), Abdul Rahim bin Haron, Basri Henri & Sharif Kultis	Fishers, Pulau Semporna	
23	20/9/2015	Messrs. Sharif Pamir b. Salipting & Johari B. Idris	Collecting agents for sharks, Pulau Semporna	
24	21/9/2015	Messrs. Nasir, Hassan & Alin (traditional fisher) and Muliadi Harwa (fisher, trawl)	Fishers, Tawau	
25	21/9/2015	Ms. Lee (Clerk, E.H Marine), Ms. Evon Lay (Accountant, Hoi Seng Seaproducts)	Hoi Seng Seaproducts, Tawau, Sabah	

Appendix I: List of Stakeholders and Activities

No.	Date	Stakeholder	Notes	Activity
26	15/12/2015	Messrs. Salleh Hj. Salleh, Hassan Ab. Karid, Umra Amirhases, Hj. Mohd Saipa Lam	Chairperson and members of PNK Semporna	Discussion
27	15/12/2015	Mr. Radi bin Lajani	Fisher, Semporna	Discussion
28	16/12/2015	Messrs. Pin Datun, Silibik, Ollok'an	Fishers, Kg. Labuan Haji, Pulau Bum-Bum, Semporna	Pre-test
29	16/12/2015	Messrs. Sharif bin Kultis, Jani bin Habibi, Admar bin Musrin, Mubin bin Hj Paraja	Fishers, Pulau Semporna, Semporna	Pre-test
30	18/12/2015	Village Head	Fisher, Kg. Lok Urai, Pulau Gaya, Kota Kinabalu	Discussion
31	4/4/2016	Traditional fishers (Rawai)	Kg, Perhala dan Tanah Merah	Socio-economic profiling
32	5/4/2016	Traditional fishers (Rawai)	Fishers, Kg. Sim-Sim	
33	5/4/2016	Fishers (trawl)	Sandakan, Sabah	
34	7/4/2016	Traditional fishers (Rawai)	Pulau Semporna, Semporna	
35	15/6/2016	Trader (dry market)	Philippines market, Kota Kinabalu	
36	15/6/2016	Mr. Sadik bin Ebu	Wholesaler for sharks and rays, Kota Kinabalu	
37	16/6/2016	Mr. Sadik bin Ebu	SAFMA jetty	
38	16/6/2016	Trader	Inflamega Sdn. Bhd, KK	
39	16/6/2016	Mdm. Ida	Sabah Seasource Sdn. Bhd, KK	
40	17/6/2016	Retailers (sharks and rays)	Wet market, SAFMA jetty	
41	8-9/9/2016	Traditional fishers (Rawai)	Fishers, Kampung Tanjung Aru, Sandakan	
42	29-30/9/2016	Traditional fishers (Rawai)	Fishers, Kampung Pulau Bum-Bum, Semporna	

Appendix II: Proforma for Focus Group Discussion on Marketing of Sharks

- **Product**
 - Species, shark and ray products, size, level of processing
- **Physical Flow**
 - Agent, intermediary (local, wholesaler, retailer, processor, exporter)
 - Source: vessel, intermediary, processor, import
 - Destination: intermediary, processor, exporter
 - Quantity
- **Price**
 - Value
 - Cost
 - Method of payment
- **Promotion**
 - Services (financial service such as credit)
- **Inputs**
 - Labor
 - Capital

Marketing Questions

i. *General Questions*

- a. How long have you been in this business?
- b. Who are the owners (individual, partners, or company)?

ii. *Products Carried*

- a. What are the main species of sharks/rays transacted in your fish trading business?

Species	Size of fish (Big/Small)	Price (RM/kg)	Quantity (kg)	Demand (High/Medium/Low)

iii. *Sources*

- a. Where are your main sources of supply (vessels, intermediaries, imports)?
 - Quantity and value?

iv. *Processing*

- a. Are you involved in processing?
 - Dried
 - Salted
 - Frozen
 - Smoked
 - In brine
 - Ready to use
 - In airtight *containers*
- b. Do you do the packaging?

v. *Destination*

- a. Where are your selling destinations?
 - Local market
 - Wholesaler
 - Retailer

Appendix III: From Shift Share to Multifactor Partitioning

Shift share analysis (SSA) was introduced in the 1940 by Harry Jones. By 1960's it was used in regional economic growth studies. Although most of the early applications examined employment by sectors and regions, the methodology was also extended to study on exports. SSA determines how much of the regional growth rates - such as employment or export - can be attributed to national trends and how much is due to unique regional factors.

The approach involves the breakdown of economic change for a region relative to a benchmark region. The region in question can be a district within a state, a state within a country and a country within a regional grouping or the overall world market.

Shift share breaks growth rates into three components to help understand what is driving the change (Lamarche, 2003):

- *National growth effect* - the amount of growth or decline in an industry that could be attributed to the overall growth of the national economy.
- *Industry mix effect* - the amount of growth or decline in an industry that could be attributed to the performance of the specific industry at the national level.
- *Regional competitive effect* - the amount of growth or decline in a specific industry that could be attributed to a local advantage or disadvantage.

The mathematical notations of the above variables are as follow:

Notation	Description
0	Base year
t	Year t
E_{ij}	Export in industry i in region j
E_j	Total export in region j
E_i	Total export in industry i in the nation
$E_{..}$	Total export in the nation
r_{ij}	Export growth rate in industry i in region j
r_j	Export growth rate in region j
r_i	Export growth rate in industry i in the nation
$r_{..}$	Export growth rate in the nation

Calculation of Crude Growth Rates

- i. Crude regional growth rate:

$$r_j = \frac{E_j^t - E_j^0}{E_j^0}$$

Crude growth rate of the region is the sum of growth rates of all industries in that region

$$r_j = \sum_{i=1}^S \frac{r_{ij} E_{ij}^0}{E_j^0}$$

- ii. Crude Industry growth rate: Crude growth rate of the industry is the sum of growth rates of that industry in different regions

$$r_i = \frac{E_i^t - E_i^0}{E_i^0}$$

Crude growth rate of the industry is the sum of growth rates of that industry in different regions:

$$r_i = \sum_{j=1}^R \frac{r_{ij} E_{ij}^0}{E_i^0}$$

- iii. Crude national growth rate:

$$r_{..} = \frac{E_{..}^t - E_{..}^0}{E_{..}^0}$$

$$r_{..} = \sum_{i=1}^S \frac{r_i E_i^0}{E_{..}^0}$$

The growth in the number employed is the growth rate multiplied by the base year export.

Traditional Shift Share

The traditional shift share equation is shown as:

$$E_{.j}^0 (r_j - r_{..}) = \sum_{i=1}^S E_{ij}^0 (r_{ij} - r_{i.}) + \sum_{i=1}^S E_{ij}^0 (r_{i.} - r_{..})$$

(1)

whereby

The left hand side equation determines if a region is performing above or below the national average.

The first right hand side equation which is the regional share measures the differences between the regional industry rates and crude national industry rates. It indicates how well the industry in the region performing compared to that industry national wide. Normally the larger the regional effect, the better.

The second right hand side equation us the industry-mix share which measures the contribution of the industry-mix in the region to export growth.

Like any other indicators, SSA has its own weaknesses. For instance, shift-share does not account for many factors including the impact of business cycles, identification of actual comparative advantages, and differences caused by levels of industrial detail. It is a "snapshot" of a regional or local economy at two points in time. Thus, the analysis may not offer a clear picture of the local and national economies since the results are sensitive to the time period chosen.

Multifactor Partitioning

This study utilized multifactor partitioning (MFP) method proposed by Ray-Srinath Model (1990). While traditional SSA models rely on a comparison of industrial growth rates, the Ray-Srinath is based on a comparison of industrial structures.

When the regional growth rates are partitioned correctly the process results in the splitting of each of the two traditional components into two finer components which are correct mathematically in the sense that they measure what they say they do. Part of the industrial mix effect in multi-factor partitioning is captured under another component. The differences between SSA and MFP are shown below.

$$\begin{array}{rcccl}
 \text{SSA} = & \text{(1) World} & + & \text{(2) Region} & + & \text{(3) Industry-Mix} \\
 & \text{Effect} & & \text{Effect} & & \text{Effect} \\
 & & & \swarrow \quad \searrow & & \swarrow \quad \searrow \\
 \text{MFP} = & \text{(1) World} & + & \text{(2) True} & + & \text{(3) Region-Industry} & + & \text{(4) True Industry-} & + & \text{(5) Allocation} \\
 & \text{Effect} & & \text{Region Effect} & & \text{Interaction Effect} & & \text{Mix Effect} & & \text{effect}
 \end{array}$$

The Ray-Srinath algorithm of MFP technique is based on a fundamentally different approach; i.e., the comparison of industrial structures. The algorithm compares industrial structures through its application of the concept of standardization of growth rates. The regional industrial growth rates are adjusted according to the relative importance of each industries in the national industrial structure and not on differences in growth rates. This approach is a much more holistic one and is direct consequence of the standardization of data as explained below.

- i. Standardized industry growth rate:

$$r_i = \sum_{j=1}^R \frac{r_{ij} E_{ij}^0}{E_i^0}$$

Instead of using industry specific weight, we use total regional export weight:

$$\hat{r}_i = \sum_{j=1}^R \frac{r_{ij} E_j^0}{E_i^0}$$

- ii. Standardized region growth rate:

$$r_j = \sum_{i=1}^S \frac{r_{ij} E_{ij}^0}{E_j^0}$$

$$\hat{r}_j = \sum_{i=1}^S \frac{r_{ij} E_i^0}{E_j^0}$$

iii. Standardized national growth rate:

$$\hat{r}_{..} = \sum_{i=1}^R \frac{\hat{r}_i E_i^0}{E_{..}^0}$$

or

$$\hat{r}_{..} = \sum_{j=1}^S \frac{\hat{r}_j E_j^0}{E_{..}^0}$$

It is possible to calculate standardized national growth rate using either standardized industry or region growth rates.

MFP Formula

$$E_j^0(r_j - r_{..}) = \sum_{i=1}^S E_{ij}^0(\hat{r}_j - \hat{r}_{..}) + \sum_{i=1}^S E_{ij}^0(r_{ij} - \hat{r}_i - \hat{r}_j + \hat{r}_{..}) + \sum_{i=1}^S E_{ij}^0(\hat{r}_i - \hat{r}_{..}) + \sum_{i=1}^S E_{ij}^0(\hat{r}_{..} - r_{..}) \quad (2)$$

r_{ij} = The growth of industry i in region j
 $r_{..}$ National growth effect
 $+ (\hat{r}_j - \hat{r}_{..})$ Regional effect
 $+ (r_{ij} - \hat{r}_i - \hat{r}_j + \hat{r}_{..})$ Industry-region interaction effect
 $+ (\hat{r}_i - \hat{r}_{..})$ Industry effect
 $+ (\hat{r}_{..} - r_{..})$ Allocation effect

$$r_{ij} = r_{..} + (\hat{r}_j - \hat{r}_{..}) + (r_{ij} - \hat{r}_i - \hat{r}_j + \hat{r}_{..}) + (\hat{r}_i - \hat{r}_{..}) + (\hat{r}_{..} - r_{..}) \quad (3)$$

To obtain export effect we can multiply by base year export:

$$r_{ij} E_{ij}^0 = r_{..} E_{ij}^0 + E_{ij}^0(\hat{r}_j - \hat{r}_{..}) + E_{ij}^0(r_{ij} - \hat{r}_i - \hat{r}_j + \hat{r}_{..}) + E_{ij}^0(\hat{r}_i - \hat{r}_{..}) + E_{ij}^0(\hat{r}_{..} - r_{..}) \quad (4)$$

These values can be calculated for each industry in turn, in region j and then summed:

$$\sum_{i=1}^S r_{ij} E_{ij}^0 = r_{..} E_j^0 + E_j^0(\hat{r}_j - \hat{r}_{..}) + \sum_{i=1}^S E_{ij}^0(r_{ij} - \hat{r}_i - \hat{r}_j + \hat{r}_{..}) + \sum_{i=1}^S E_{ij}^0(\hat{r}_i - \hat{r}_{..}) + E_j^0(\hat{r}_{..} - r_{..}) \quad (5)$$

Appendix IV: Revealed Trade Advantage

Volrath's (1991) relative trade advantage (RTA) index accounts for exports and imports simultaneously. That is the difference between (RXA) and its counterpart, the relative import specialization (RMA) index:

$$RTA_{ij} = RXA_{ij} - RMA_{ij}$$

$$RXA_{ij} = (X_{ij} / \sum_{t,t \neq j} X_{it}) / (\sum_{n,n \neq i} X_{nj} / \sum_{n,n \neq i} \sum_{t,t \neq j} X_{nt})$$

$$RMA_{ij} = (M_{ij} / \sum_{t,t \neq j} XM_{it}) / (\sum_{n,n \neq i} M_{nj} / \sum_{n,n \neq i} \sum_{t,t \neq j} M_{nt})$$

Where:

Numerator is export/import of reference commodity in reference country over export/import of other commodities in reference country. That is the share/ratio of reference commodity in export/import of reference country.

Denominator is export/import of reference commodity by other countries over export/import of other commodities by other countries. That is the share/ratio of reference commodity in export/import of other countries.

It measures a country's export and import of a commodity relative to its total exports and imports, respectively, and to the corresponding export and import performance of a set of countries, which are used as the benchmark of comparison. In other words, RXA (RMA) measures the export (import) share of reference commodity by reference country to the whole region's export (import). If $RTA > 0$, then a relative trade advantage is revealed, that is a sector in which the country's trade is relatively more competitive.

Printed by



GONG BADAQ, 21300 KUALA TERENGGANU, TERENGGANU
Tel: 09-666 8611, 666 6652, 666 8601 Faks: 09-666 0611/666 0063

SEAF

ISBN 978-983-9114-72-0



9 789839 114720