

APPENDIX 2

**TRADE IN SHARK PRODUCTS
IN MALAYSIA, SINGAPORE AND THAILAND**

By Shelley Clarke
Consultant

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1 INTRODUCTION

1.1 Background to this Study

This study is one of three related investigations, jointly undertaken by the Association of Southeast Asian Nations (ASEAN) and the Southeast Asian Fisheries Development Center (SEAFDEC), designed to document shark fisheries and trade in the region. These studies were initiated following an agreement at the ASEAN-SEAFDEC Regional Technical Consultation on Shark Fisheries held in Vientiane, Lao PDR in May 2003. This component of the study characterizes the trade in shark products while parallel studies will explore the status and trends of shark fisheries and the utilization of shark products in Southeast Asia.

In concert, these studies are intended to serve as an essential basis for developing appropriate fisheries management policies and actions, and thereby promote national and regional responsibility for marine resource management issues. Documenting and strengthening data collection and monitoring systems for shark fisheries and shark product trade in this way will facilitate implementation of national programs which underpin international policies articulated by the United National Food and Agriculture Organization (FAO) such as the Code of Conduct for Responsible Fisheries and the International Plan of Action for Sharks. Effective national management of shark resource issues is the most reliable means of ensuring sustainable harvests while supporting the local communities and industries which depend on shark products.

1.2 Scope of this Study

Although trade in shark products occurs throughout Southeast Asia, it was agreed that the scope of this study would encompass Malaysia, Singapore and Thailand in this initial stage, and that based on the results presented here, trade studies may be extended to other ASEAN countries in the future. The rationale for focusing this study on Malaysia, Singapore and Thailand was that the regional trade in shark fins, which is the most valuable of all shark-derived products, was believed to be concentrated in these three countries. In order to complement the parallel study of shark utilization, the range of products included in the present study was not limited to shark fins although the bulk of available information was expected to pertain to this product.

This report first presents an introduction to the trade in shark products which highlights the variety of useful goods derived from sharks. The remainder of the report is organized around four research questions intended to elucidate key features of the shark trade in Southeast Asia:

- **Product Sources:** What contribution do regional shark resources make to local and world shark production figures and how is excess regional demand met?
- **Trade Volume:** What is the volume of regional trade in shark products and its context in the global trade?
- **Product Disposition:** What quantities of various shark products are consumed within, as opposed to being transshipped through, the region and what factors influence regional demand?
- **Trade Characteristics:** How do the features and trends of the shark product trade differ by country and as a region from other world markets?

A combination of existing literature, statistical trade and production records, and field surveys involving trader interviews was used to address each of these research questions. Compilation and analysis was undertaken during the period September through November 2003 and thus represents the situation at that time. As is often the case with trade analyses, data sources may be incomplete or otherwise unreliable due to the protection of confidential business information as well as other factors. This report attempts to provide the most accurate description of the trade based on available information, acknowledging shortcomings of the data wherever applicable. Cases of data interpretation and presentation of quantitative information are clearly

distinguished and objectively interpreted. Methodologies used in each analysis are described in the following sections.

2 OVERVIEW OF SHARK PRODUCTS IN TRADE

2.1 Introduction

The diversity of shark products is remarkable among fisheries commodities (Figure 2.1), and this range of products is matched by the exceptionally large variability in the value of the products (Vannuccini 1999). Shark meat harvested by subsistence fishermen may provide an important source of protein (Rose 1996; Joseph 1999; Almada-Villela 2002; Shehe and Jiddawi 2002), but sharks caught in more profitable fisheries, such as longliners targeting tuna or swordfish, are often considered bycatch due to the low market value of the flesh. In contrast to the relatively low value of shark meat, shark fins, particularly those from highly desirable species, are some of the most expensive food products in the world (Fong and Anderson 2002). The markets for other shark products, including skin, liver oil, cartilage, and teeth are difficult to characterize due to a lack of information and apparent instability due to frequent shifts in market demand (Rose 1996; Vannuccini 1999).

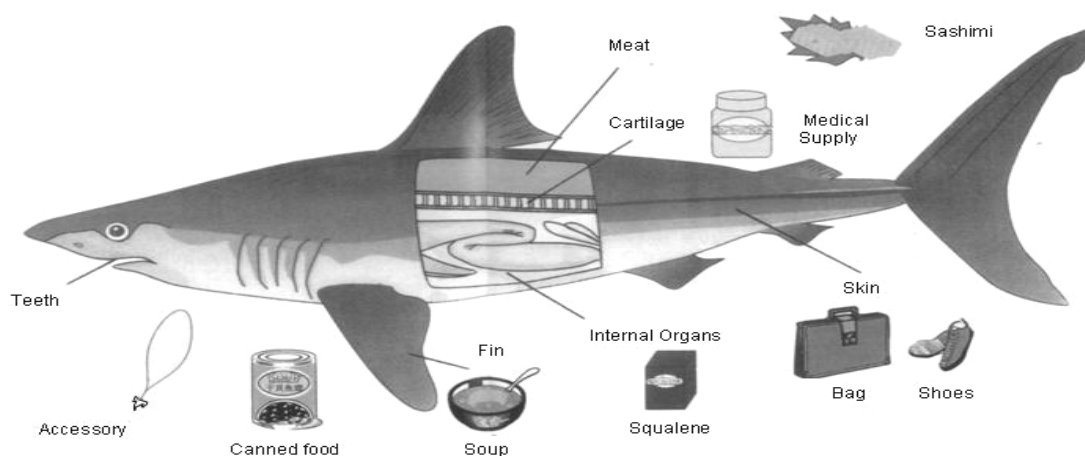


Figure 2.1 Illustration of the range of products derived from sharks.
(Figure courtesy of the Global Guardian Trust, Japan).

2.2 Shark Meat

The quality of shark meat varies both by species and according to handling practices. In developed countries, shark meat is generally sold as fillets and usually only the more desirable pelagic species, such as shortfin mako (*Isurus oxyrinchus*), common thresher (*Alopias vulpinus*), and porbeagle (*Lamna nasus*), are marketed (Vannuccini 1999). A greater variety of sharks are utilized for a greater number of products in Asia, but use of shark meat as the raw material for “fish balls” through either mechanized or manual processing is most common. Other edible shark products are derived from shark stomach (e.g. smoked thresher shark stomach in Taiwan), heart (e.g. salmon shark sashimi in Japan), or other organs. Blue shark (*Prionace glauca*) meat is often smoked, and meat from the whale shark (*Rhincodon typus*), known as the “tofu shark” in Chinese, is popular in Taiwan.

The most comprehensive source of information on production and trade in shark meat is the Food and Agriculture Organization (FAO) Production and Trade Database, 1976-2001 (FAO 2003a). This dataset provides statistics for fourteen commodity types which specifically reference shark meat although some of the categories also include rays and/or chimaeras (i.e. the elasmobranch group of fishes). Also, since shark meat products are undoubtedly sometimes

included in undefined categories of fish (i.e. fish fillets, fish meat, fish paste, fish not elsewhere indicated (nei), etc.), FAO figures for shark products are expected to underestimate the true figures (Shotton 1999). In the past decade, the combined production quantities of all elasmobranch meat products grew from approximately 57,000 mt in 1992 to over 76,000 mt in 1998, but declined to just under 63,000 mt in 2001. Reported production quantities represent between 7 and 9% of reported elasmobranch capture production in each year throughout this period. In 2001, most elasmobranch meat production was in the form of frozen sharks (64%), with 35% in the form of dried sharks, and the remainder in fresh or chilled form (Figure 2.2). In terms of trade in shark meat, Italy was consistently the world's largest importer throughout the 1990s until Spain surpassed it in 2000 and 2001 by importing approximately 14 to 16 thousand mt per annum. Spain also exports the greatest quantities of shark meat (12,377 mt in 2001).

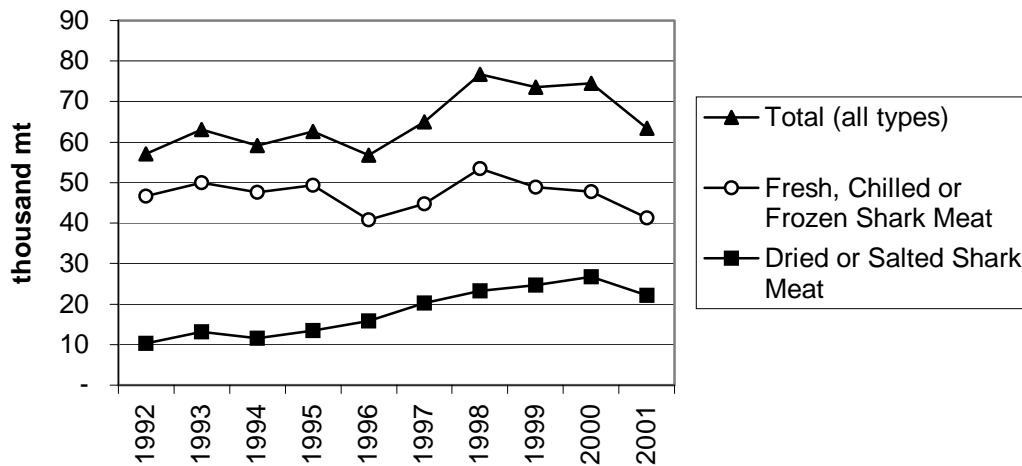


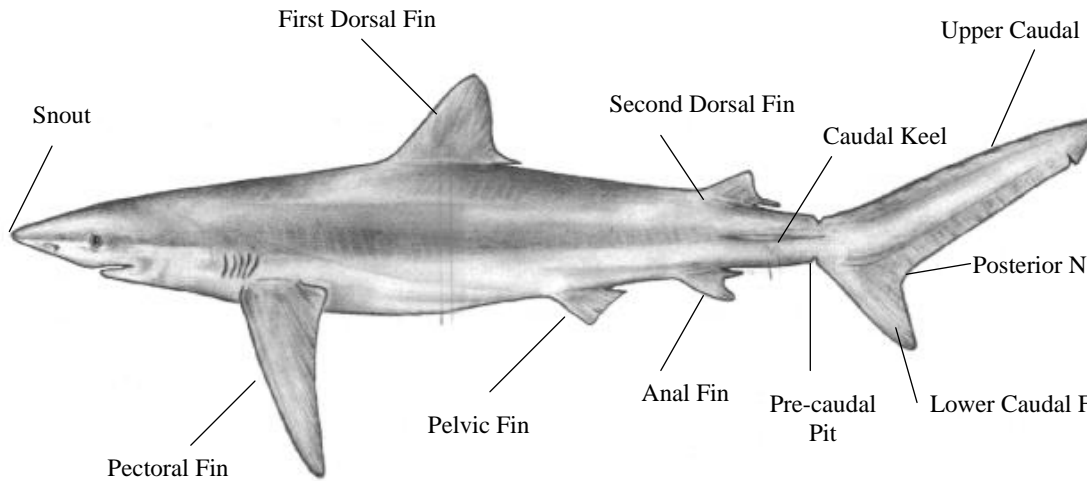
Figure 2.2 Global production of shark meat, 1992-2001 (FAO 2003a).

There is not necessarily a strong or direct relationship between production of shark meat and traded quantities, particularly when domestic consumption is high. For example, in 2001 Pakistan was the world's largest producer of shark meat (22,000 mt, all products), but none of this production was exported indicating a high domestic consumption. In contrast, although Spain reports high shark meat exports, the difference between the sum of its production plus its imports of all types of shark meat (27,492 mt in 2000), and its exports/re-exports (12,377 mt in 2001), is sufficiently large (15,115 mt) to rank it second behind Pakistan in domestic consumption (FAO 2003a).

Price information for various species of sharks was compiled under a survey of FAO's GLOBEFISH worldwide network of industry information and other sources (Vannuccini 1999). Blue sharks and threshers were the least valuable at \$1.00-\$1.60 and \$0.49-\$3.35 US per kg, respectively, whereas makos sold for \$1.37-\$3.62 US per kg. The most expensive shark meat in the survey was spiny dogfish originating in the United Kingdom and sold in Italy for \$8.13-\$9.91 US per kg (Vannuccini 1999). Chen and Phipps (2002) reported retail prices for whale shark meat of up to \$17 US per kg in Taiwan.

2.3 Shark Fins

Fins command the highest price of any shark product and are utilized primarily in Chinese haute cuisine for soups and casseroles. For most species, four fins are used from each shark: the first dorsal fin, the two pectoral fins, and the lower lobe of the caudal fin (Figure 2.3). In dorso-ventrally compressed species, the two dorsal fins and the caudal fin are most valued (Kreuzer and Ahmed 1978). Other fins, including the upper caudal, second dorsal, pelvic and anal fins (if present), may also be taken but are not mixed with the other fins and command a much lower market value.



Drawing of *Prionace glauca* (blue shark) sourced from Grace (2001).

The use of a “half moon” cut to remove the fin from the shark without leaving any attached tissue is preferred by traders and commonly practiced by fishermen, particularly for higher value fins (Lai 1983, McCoy and Ishihara 1999). While fins may be sold as sets by fishermen, traders often break these sets and re-sort fins into lots by fin position and size prior to marketing. Most restaurants serving shark fin will describe the product in terms of the grade of fin (e.g. ordinary versus superior), with only specialty restaurants making note of other details such as the type of shark.

A fin’s value is ultimately determined by the number and quality of ceratotrichia, or fin needles, that can be produced from it. On this basis, traders prefer certain types of fin (e.g. the lower caudal) and types of shark, as well as fins which are large, well preserved and free of urea tainting from attached meat (Rose 1996). Traders state that they classify shark fins into 30-40 different shark categories (Yeung et al. 2000, Vannuccini 1999). A recent study asked 17 Hong Kong traders to rank their preferences for seven types of shark fins (Fong and Anderson 2000). In descending order of preference the ranking was ‘tiger’, ‘hammerhead’, ‘sandbar’, ‘blacktip’, ‘brown’, ‘blue’, ‘porbeagle/salmon’. The same study found that the most valuable fins were caudal, dorsal and pectoral fins, respectively. However, it also concluded that a given fin’s value is a function of shark type (species), fin size and fin cut and this may explain why previous studies have produced inconsistent results and have not been able to clearly establish which shark fins are most highly sought after (Rose 1996, Anak 2002).

Definitive attribution of common names (in English or Chinese) for various types of sharks or shark fins to taxonomically distinct species or families is problematic since traders may aggregate less distinctive species into broad trade categories. A study using DNA techniques to match trade names to species and estimate species composition in the Hong Kong market found that blue shark fins comprised at least 18% of traded fins by weight whereas hammerheads (*Sphyrna* sp.) and silky shark (*Carcharhinus falciformis*) constituted at least 6% and 4% by weight, respectively. All of the other identified species were found to comprise 3% or less by weight, but all figures were considered minimum estimates as nearly half of the market could not be characterized (Clarke 2003).

Most published information on prices for shark fin consist of anecdotal data recorded in Hong Kong. Information collected in 1996 indicated that retail prices generally ranged from 166 to 564 USD per kg but that a single large fin could fetch prices of up to 846 USD per kg. Restaurants serving shark fin soup were quoted as charging from 4.50 to 90 USD per bowl

(Parry-Jones 1996). Fong and Anderson (1998) quote prices for processed fins in Hong Kong ranging from 125 to 415 USD per kg.

Identification of key supply countries or fishing fleets for shark fins is complicated by foreign (or 'third party') landings and transshipment of fins at sea. These practices serve to obscure catches from particular fisheries, since the products of different vessels or fisheries are often combined and recorded in the port of landing, regardless of location of capture. There is also confusion in existing databases regarding unprocessed and processed forms of shark fin. For example, in the FAO Production and Trade Database, the People's Republic of China (PRC) is the leading country for shark fin production in 2001 but these figures are likely to represent processed fins produced from raw materials sourced overseas. In contrast, figures from Indonesia, which in 2001 ranks second in shark fin production and first in elasmobranch capture fisheries, are likely to represent local production of raw as well as processed fins.

Countries reporting the greatest export or re-export quantities of shark fins in 2001 were, in descending order, Hong Kong, the PRC, Taiwan, Indonesia, the United Arab Emirates, the United States, Yemen and Japan and represent a mixture of producers of unprocessed fins, trade entrepôts, and processing countries. Imports are dominated by Hong Kong and the PRC to the extent that reported quantities from these two countries comprise 97% of global imports (14,046 mt) in 2001 (FAO 2003a). Singapore is also known to be a key trading center (Kreuzer and Ahmed 1978, Ferdouse 1997, Vannuccini 1999), but does not report trade in this product to FAO (see Section 4.1).

2.4 Shark Skin, Liver Oil, Cartilage and Teeth

In addition to their harvest for meat and fins, sharks are also utilized for their skin, liver oil, cartilage and teeth. The markets for these products have fluctuated over the past few decades and, based on available information, do not appear to be major components of the marine products trade. In most cases, the value of shark skin, liver oil, cartilage and teeth do not appear to be high enough to drive fishing effort on their own; they are more likely to be secondary products of sharks caught either as bycatch or as targets for higher value shark products such as fins or meat.

Untanned shark skin, known as shagreen, has historically been used as a polishing cloth, as a grip for sword hilts in Japan, and in dried or smoked form as food (Rose 1996, Vannuccini 1999). However, it was the development of a tanning process for shark skin in the United States in the 1930s which created the market for shark leather products. Shark skin boots and shoes are still produced in the United States and Mexico (Rose 1998), and India, Spain, Japan and France use shark and ray skin for handbags, wallets, watchstraps, and belts (Rose 1996, Vannuccini 1999). The handling processes for shark meat and shark skin are largely incompatible since the quality of the skin is degraded if placed in contact with freshwater or ice, or cut in the preparation of shark trunks for meat (Rose 1996). The preferred species for shark skin production appears to be the tiger shark (*Galeocerdo cuvier*) (Kreuzer and Ahmed 1978, Rose 1996) and the skin of the abundant blue shark is considered to be of low quality (Rose 1996). Another reported use of shark skin in Taiwan and Mainland China is as 'filler' material for shark fin soup. Restaurants in these countries and also other areas marketing low grade soup products reportedly scrape the denticles from the skin and finely shred it, then add it to soup servings to bulk up the shark content. FAO does not maintain production and trade figures for shark skin and the worldwide volume of trade is unknown.

The large liver oil content of sharks was heavily exploited as a vitamin A supplement in the early 1900s until the late 1940s when synthetic production of vitamin A caused the market to crash (Rose 1996, 1998). Another useful compound found within shark liver oil is squalene, although sharks that have a high squalene level tend to have a lower vitamin A content in their liver oil (Subasinghe 1998). Industrial uses of shark liver oil have included lighting oil,

machine oil, and anti-foulant hull coating but the most visible trade in shark liver oil involves its promotion as a cure for cancer (Vannuccini 1999). In addition to these labeled uses of shark liver oil, it may be used as source of either vitamin A or squalene compounds which then may be used as an unidentified ingredient in various hand lotion, sunscreen, skin healing products and health foods (Subasinghe 1998). European markets for shark liver oil or squalene products appear to be growing (Subasinghe 1998). As of the mid 1990s the world's largest consumer of shark liver oil was thought to be South Korea (Rose 1996, Vannuccini 1999). However, reported domestic production in South Korea has dropped from 35 mt in 1994 to less than 2 mt in 1995-1997 and nil production thereafter. Imports have also declined from a high of 699 mt in 1991 to less than 100 mt per annum from 1997-2001 (FAO 2003a). Indonesia was known to be the major supplier of shark liver oil to South Korea (Rose 1996) but does not report any statistics for shark liver oil to FAO. It is difficult to identify preferred species, as almost any shark can be used for production of shark liver oil, although quantity and quality of the oil will vary (Rose 1996).

Much publicity was generated by claims in the early 1990s that application of concentrated shark cartilage extracts can inhibit vascularization of tumors and thereby aid in the treatment of cancer. As a result the production and sale of alternative medicine products from shark cartilage boomed (Rose 1996). Market investigation revealed that prices of shark cartilage tablets have fallen perhaps due to brand competition, and press reports disputing the benefits (Vannuccini 1999), although overall the market may be expanding (Fowler et al., in press). Production and trade of shark cartilage is not well-described (Vannuccini 1999) although the total value of the cartilage of a shark is expected to be extremely low relative to the value of the meat and fins (Rose 1996). Shark cartilage products are formed from either dried or frozen vertebrae, heads, jaws or gills, or from cartilage extracted from fins during processing (Rose 1996, Subasinghe 1998). Traders report that processing of shark cartilage into chondroitin is centered in Japan where this compound is used in eye drop formulations. While the popular literature touts 'deepsea' sharks as superior for medicinal purposes, in practice cartilage products are made from a variety of different sharks (Vannuccini 1999).

There is a minor market for shark teeth and jaws but as for cartilage, these are in most cases expected to be produced as by-products of existing fisheries. Rose (1996) reports the preferred species as mako, great white, and tiger sharks presumably due to their tooth size. The dearth of reliable statistics on shark curios may be attributable to the relatively low volume trade and a lack of businesses focusing specifically on these products.

3 PRODUCT SOURCES

The objective of this section is to present and discuss trade information relating to the source of shark products traded in Malaysia, Singapore and Thailand. The most direct means of addressing production of shark products from the waters of, or by fishing fleets based in, these countries is to study the disposition of catches landed at local fishing ports. Therefore, the parallel study on shark landings and utilization should be consulted as the primary source of domestic production information. The discussion in this section provides supplemental information on domestic production based on trade sources and can be combined with the utilization study results to present an integrated description of the supply chain. To further supplement the discussion of domestic production provided here and in the parallel report, this section analyzes import information to determine the extent to which shark products are sourced through external trade.

3.1 Sources of Shark Products within Malaysia, Singapore and Thailand

As reported in the previous chapter, world production of shark meat totaled approximately 63,000 mt in 2001, the vast majority of which was in frozen (65%) or dried, salted or in brine (35%) forms (FAO 2003a). Neither Malaysia nor Singapore reported any elasmobranch meat

production between 1976 and 2001, whereas Thailand's production was estimated at approximately 3,500 mt per annum through 1990 but was not reported in later years. The only ASEAN country to report any shark meat production in 2001 was Indonesia which recorded production of 26 mt of frozen shark meat (FAO 2003a). Within ASEAN the only countries reporting production of shark fins between 1997 and 2001 were Indonesia (200-1,200 mt per annum), Singapore (100 to 500 mt per annum) and the Philippines (10-90 mt per annum). It is not clear from the data whether these quantities refer to processed or unprocessed fins, but given Singapore's reported capture production for sharks of less than 100 mt per annum between 1997 and 2001 (FAO 2003a), Singapore's production of shark fin most likely refers to production of processed fins from imported raw product. Indonesia's reported production may be either raw fins derived from domestic landings or processed fins produced in Indonesia factories (see Section 6).

Although these figures suggest that large quantities of shark products are not originating in Malaysia and Thailand, other evidence indicates that this may not be the case. Ali and Isa (2002) report average shark landings between 1988 and 1995 of 2,280 mt per annum for Peninsular Malaysia and 3,672 mt per annum for Sarawak and Sabah, and of over 3,000 mt per annum for Thailand. FAO elasmobranch (sharks, skates and rays) capture production statistics for 2001 report figures of 25,200 mt for Malaysia and 22,000 mt for Thailand, ranking these countries tenth and thirteenth worldwide, respectively, for elasmobranch landings (FAO 2003a). As mentioned above Singapore's capture production for sharks has not exceeded 100 mt per annum for several years and thus domestic production shark products is expected to be minimal (FAO 2003a).

According to conversion factors developed by the International Union for the Conservation of Nature (IUCN) Shark Specialist Group, the carcass weight of a shark which has been headed, gutted and finned should be approximately 40% of the whole shark weight, and the fin weight should be 2% of the whole shark weight (IUCN 2003). On this basis, the landings reported by Malaysia and Thailand in 2001 should equate to approximately 10,000 mt and 8,500 mt per annum of shark meat production, and 500 mt and 175 mt, respectively of wet shark fins. It is noted, however that comparison of the ratio of elasmobranch landings to production for most countries reporting to FAO reveals a much lower level of production than would be expected on the basis of the conversion factors above. This situation may arise from separate reporting systems for landings (capture production) and production datasets in each country and/or the fact that production figures are only compiled for commodities which are processed or preserved, and thus may exclude any fresh products (FAO 2003b).

Another way of exploring national production of shark products is to examine whether there is a continuous trend of exports exceeding imports for a given commodity. According to conventional interpretation, consistently higher export figures would be expected to arise from excess domestic production. A comparison of exports to imports of shark meat (fresh, chilled and frozen forms) for Malaysia (Anon. 1998, 1999a, 2000, 2001 and 2003a), Singapore (Anon. 1999b, Anon. 2002, Anon. 2003b, Anon. 2003c), and Thailand (Anon. 2003d) from 1997 to 2002 showed only a few instances in which exports were substantially higher (i.e. >20 mt). Specifically, Malaysia's exports of frozen shark meat exceeded its imports by 92 mt in 1998, and Singapore's exports of the same product exceeded its imports by 180, 420 and 220 mt, respectively in 1997, 1999 and 2000. In the latter case, since Singapore does not produce shark meat, the surplus must arise from unreported or undisclosed imports of shark meat, or misclassification of an exported product. For shark fins, exports greatly exceeded imports only for Thailand and only in 1998 when a difference of 100 mt may have derived from domestic production.

On the whole, this comparison between imports and exports does not provide a basis for inferring large amounts of domestic production of shark products within the three studied countries. However, comparison of landings with production data for Malaysia and Thailand

suggests actual figures for shark production are not reflected in the FAO dataset. Such under- or non-reporting of production may arise from data not been reported in shark-specific categories or simply not being recorded in the statistical systems at all. This situation is common not only for most countries catching sharks, but also across a wide range of fisheries products. While this is therefore a widespread issue in fisheries statistics, further strengthening and linking of landings, production and trade databases in the Southeast Asian region would be useful in facilitating future discussions of shark utilization. It is therefore recommended that improvement of statistical systems for monitoring production be considered alongside measures to improve fishery catch statistics as discussed in the parallel study on shark fisheries and utilization.

3.2 Sources of Shark Products External to Malaysia, Singapore and Thailand

The preceding section presents evidence which suggests that an unknown, but possibly substantial, portion of the raw materials for Malaysia and Thailand's shark commodity production derives from local resources. This section explores the external sources of shark products supplying Singapore and supplementing local resources in Malaysia and Thailand. National customs statistics for imports as well as information from trade surveys are used to determine which countries are major suppliers. Only two types of shark products, meat and fins, are included in national trade statistics for Malaysia, Singapore and Thailand, therefore only these products are discussed.

Of the three countries covered in this study, Singapore has the lowest shark landings and thus relies most heavily on trade to provide supplies of shark meat. Between 1997 and 2002, Singapore reported importing between 1,000 and 2,000 mt of shark meat per annum. The majority of Singapore's frozen shark meat in whole and fillet forms (200 to 1,000 mt per annum) was supplied by the British Indian Ocean Territory, Thailand, Taiwan and Japan (Anon. 1999b, Anon. 2002, Anon. 2003b, Anon. 2003c). In recent years, South Korea and South Africa have exported substantial quantities of frozen shark meat (>100 mt per annum) to Singapore. Considerably lesser quantities of fresh shark meat in whole and fillet forms are imported to Singapore (<170 mt per annum) and most is sourced from Malaysia and Thailand.

The preceding discussion of imports to Singapore is based on official statistics released by the Singapore government which, for reasons of policy, do not include imports from Indonesia. In order to assess whether shark meat imports from Indonesia would substantially effect the overall tally of Singapore's imports, data for shark products exported from Indonesia to Singapore was compiled from Indonesian government sources (Anon. 2003e). From 1997 to 1999, Indonesian exports of frozen shark meat to Singapore were less than 1 mt per annum, but in more recent years quantities have totaled 50 mt in 2000 and approximately 8 mt in 2001 and 2002. Nevertheless, on this basis, Indonesia does not meet the criteria established above for major suppliers of shark meat.

Although Malaysia and Thailand's shark meat imports are low relative to Singapore's imports, these countries' trade is similar in focusing primarily (>97% in each year) on frozen rather than fresh forms. Import statistics for 1997 through 2002 show that Malaysia usually imports 10 to 70 mt of frozen meat per annum, whereas Thailand's import volumes are higher and generally range from 110 to 320 mt per annum. Major suppliers (>20 mt in a single year) to Malaysia between 1997 and 2002 include Indonesia, New Zealand, Singapore and Spain. Major suppliers to Thailand (>100 mt in a single year) during the same years are the United States and Canada. For both Malaysia and Thailand, the absence of commodity codes specifically for frozen fins may result in some frozen shark fins being declared as frozen shark meat. While this is suggested by the declared value of some shipments of frozen shark meat, it cannot be verified on the basis of existing information.

Similar to the situation for shark meat, Singapore obtains most of its shark fin supplies through imports. When examining the sources of unprocessed shark fins imported by Singapore, it is important to note unprocessed frozen fins are tallied as prepared shark fin in published statistics. Therefore the following discussion is based on both the dried shark fin and prepared shark fin import statistics (Anon. 1999b, Anon. 2002, Anon. 2003b and Anon. 2003c). Between 2000 and 2002, Singapore imported 600 to 1,500 mt per annum of dried and frozen shark fins from 63 countries. Major suppliers (>90 mt per annum, dried or frozen) to Singapore during this period included the British Indian Ocean Territory (frozen and dried), Hong Kong (dried), Spain (frozen), India (dried), Taiwan (dried), Costa Rica (frozen) and Yemen (dried). Records also indicate between 60-90 mt per annum of frozen fins were imported from the United Kingdom in 2000-2002. Traders indicate that substantial quantities of shark fins derive from Indonesia but quantities are not disclosed in official statistics. Export records from Indonesia showing quantities of dried shark fins shipped to Singapore are given in Table 3.1. When added to the official Singapore imports of shark fin, the quantities in Table 3.1 represent 7 to 29% of Singapore's total imports, but according to information reviewed as part of this study, these figures are likely to under-represent the true quantity of shark fins in trade between these two countries.

Table 3.1 Indonesian exports of shark fins to Singapore, 1997-2002 (Anon. 2003e).

	1997	1998	1999	2000	2001	2002
Shark Fins, Dried (mt)	369	93	155	172	73	164

Thailand imports smaller quantities of shark fins (100-200 mt per year) and sources imports from a smaller number of countries: 20-25 countries per annum supplied shark fin to Thailand between 1997 and 2002 (Anon. 2003d). In 1997 and 1998 approximately 70% of Thailand's imports were sourced from Hong Kong, and Hong Kong remained the major supplier through 2002. This finding is consistent with the statement in Ferdouse (1997) that as of the mid 1990s Thailand was receiving medium and low grade unprocessed fins from Hong Kong for the manufacture of ready-to-eat consumer packs. Based on more recent statistics from Hong Kong (Anon. 2003f), both processed and unprocessed forms of shark fins are shipped to Thailand in approximately equal proportions (i.e. if unprocessed fin weights converted to their processed equivalents using a factor of 0.35, the amount is nearly equivalent to the exports of processed fin; Clarke 2003). Between 1999 and 2001 Thailand's sources of shark fin diversified as the proportion of imports from Hong Kong decreased and supplier countries such as Canada, Argentina, and India began contributing over 10 mt per annum. In 2002, China became Thailand's second largest supplier (19 mt) contributing 32% of annual imports.

Malaysia imports even smaller quantities of shark fins (50-125 mt per annum) and from a smaller number of countries (8-14 per annum) than Thailand (Anon. 2003a). Malaysia's largest and most consistent external supplier of shark fin (> 15 mt dried or 'salted' per annum) between 1997 and 2002 was Indonesia. Interviews with Malaysian traders indicated that Sumatra was the primary source of their shark fins and that there are processing operations based there. Singapore was Malaysia's largest supplier in 1997, contributing over 55 mt of dried fins, but imports from Singapore have declined annually since then and dropped below 10 mt per annum in 2001 and 2002. A preference for importing from Singapore may arise from favorable tariff rates for trade within ASEAN countries (Ferdouse 1997), although higher costs associated with using Singapore as a transshipment point (e.g. Singapore's 5% Goods and Service Tax) may erode this advantage. In addition to Indonesia and Singapore, countries supplying over 10 mt in any one year to Malaysia included Mauritius (11 mt in 1997), Hong Kong (10 mt in 1997, 16 mt in 2000), Chile (14 mt in 1998), Spain (44 mt in 1999), and China (24 mt in 2001). India was also considered a major supplier by two of the Malaysian traders interviewed for this study.

Information on external sources of shark products for Malaysia, Singapore and Thailand is summarized in Figure 3.1. Singapore represents a key regional trading hub, receiving meat and

fins from a large number of countries. In contrast, Malaysia's external sources for shark meat and fins are more limited to its close neighbors (Indonesia and Singapore), while Thailand is more likely to obtain shark fins from Hong Kong and China and shark meat from North America.

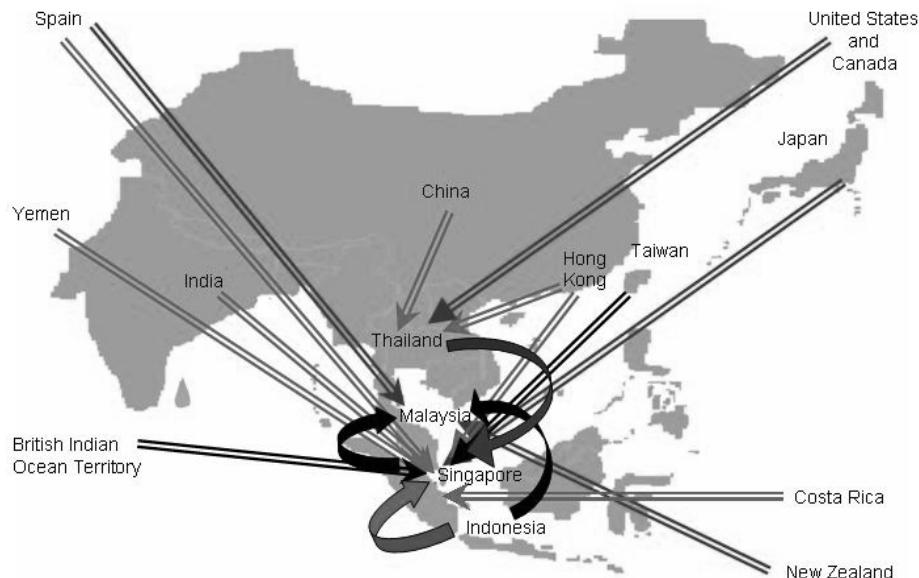


Figure 3.1 Major suppliers of shark meat and fins to Malaysia, Singapore and Thailand. Red arrows indicate shipments of meat, blue arrows indicate shipments of fins and black arrows indicate shipments of both meat and fins. Curved arrows represent trade within ASEAN whereas straight arrows represent non-ASEAN trade. Criteria for 'major suppliers' vary for Malaysia, Singapore and Thailand and are given in the text.

4 TRADE VOLUMES

This section assesses the total volume of trade in shark products transiting Malaysia, Singapore and Thailand using an international trade database for fisheries products (FAO 2003a). The analysis focuses on comparing reported trade volumes between the three countries and other countries participating in the trade. Subsequently, and where possible, reported quantities are adjusted for double counting and product form (e.g. water content) in order to provide an more accurate estimate of the world trade and each country's share. Based on the availability of national trade records, this discussion is again limited to shark meat and shark fins.

4.1 Global Comparison of Trade Volumes

The only standardized global dataset of trade volumes in fisheries commodities is the FAO Commodities Production and Trade Database (FAO 2003a). Despite shortcomings associated with product aggregation, and under- and non-reporting (see Section 2), this dataset provides the best basis for comparison between all countries trading in shark products¹. The database includes import and export data for 14 categories of chondrichthyan (shark, skate, ray and chimaera) meat, two categories of shark fins and two categories of shark liver oil. (The

¹ For consistency, figures cited for Malaysia, Singapore and Thailand in this section are those given by FAO, rather than those given by national customs authorities, but any inconsistencies are noted.

database also includes production data which were discussed in Section 3). Of these 18 shark product categories, Malaysia, Singapore and Thailand only report trade in three to FAO: 'sharks, frozen', 'sharks, fresh or chilled' and 'shark fins, dried, salted, etc'.

Given the potential for overlap in the FAO commodity categories (e.g. 'sharks, frozen'; 'shark fillets, frozen'; 'sharks, rays, chimaeras, nei frozen'), in order to avoid excluding similar products reported in slightly different categories when comparing at a global level it is necessary to group chondrichthyan meat products into subsets. For this reason, the 14 categories of chondrichthyan meat were divided into frozen, fresh/chilled and dried subsets, and the frozen and fresh/chilled commodity subsets were tallied for each of the three target countries, the ASEAN member states, the Asian continent and worldwide. The dried meat subset was excluded on the basis that none of the three target countries report trade in this commodity.

The results for 1992 through 2001 show that imports and exports of fresh or chilled chondrichthyan meat by Malaysia and Thailand are either not reported or nil in most years (Table 4.1). Imports of fresh or chilled meat to Singapore account for nearly all of the ASEAN reported imports but overall ASEAN imports comprise only 20% of Asian reported imports. Exports of fresh or chilled meat from Malaysia, Singapore and Thailand, though very limited, similarly account for most of the ASEAN exports, with the notable exception of 1998, and again ASEAN exports are a small portion of reported Asian exports (<2%). Overall, imports and exports of fresh or chilled shark meat by Asian countries are negligible in comparison to global trade volumes (Table 4.1).

Malaysia, Singapore and Thailand report greater quantities of chondrichthyan meat in frozen form than in fresh or chilled form, but the sum of this trade is still low (<4%) when compared to global totals (Table 4.1). Imports to these three countries comprise nearly all of ASEAN imports of frozen meat. Exports of frozen meat by ASEAN countries in the early 1990s were not dominated by Malaysia, Singapore, and Thailand but since 1998 these three countries' share has increased, and as of 2001 these countries' exports comprised 98% of ASEAN exports. ASEAN trade in frozen shark meat constitutes 13 to 34% of Asian imports and 18 to 85% of Asian exports, respectively. Asian imports and exports total approximately one sixth to one third of the global trade in frozen meat between 1992 and 2001².

Import and export of shark fins was assessed by summing the quantities given in the FAO database for 'shark fins, dried, unsalted' and 'shark fins, dried, salted, etc.' for each of the regions of interest (Table 4.2). Shark fin data from Singapore has not been reported to FAO since 1996³ therefore the usefulness of the database in assessing regional contributions to the trade for these years is limited. Nevertheless, from 1992 through 1996 Singapore dominated ASEAN imports (60-80%) and contributed 45-65% of ASEAN exports. During these years, ASEAN imports represented only 10-20% of Asian imports, with the majority of imports recorded by Hong Kong and China. ASEAN countries played a larger role in shark fin exports contributing 40-70% of all exports recorded by Asian countries. Given the concentration of the market for shark fins in Asia, it is not surprising that Asian imports account for almost all global imports. Asian exports of shark fins are also high compared to global totals (80-90%) but as discussed in Section 2.3 this is believed to result from a combination of producers, trade

² As discussed in Section 3.2, the possibility that frozen shark fins are reported as frozen shark meat, particularly in countries which do not offer a commodity code specific to frozen shark fins, is noted but cannot be investigated further given existing information.

³ Singapore is not a member of FAO and therefore it is not required to provide its trade data to FAO on a free-of-charge basis. Singapore's policy is to charge for all data reported in the 9-digit classification system which identifies shark fin as a separate commodity (pers. comm., A. Crispoldi, Senior Fishery Statistician, Fisheries Information, Data and Statistics Unit, FAO, Rome, Italy, October 2003). Singapore's import/export trade data on shark fins are however available to the public for purchase from the Singapore Trade Connection 1996-1998 and 1999-2001 CD-ROM.

Table 4.1 Import and export quantities in metric tonnes for chondrichthyan meat products, 1992-2001 (FAO 2003a).

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Sum '92-'01
Shark Meat (Fresh or Chilled)												
Imports	Malaysia	na	na	na	na	na	na	na	na	na	na	-
	Singapore	na	na	na	85	66	52	33	24	103	108	471
	Thailand	na	0	22	na	0	0	0	0	0	0	22
	<i>Subtotal</i>	<i>na</i>	<i>na</i>	<i>22</i>	<i>85</i>	<i>66</i>	<i>52</i>	<i>33</i>	<i>24</i>	<i>103</i>	<i>108</i>	<i>493</i>
	ASEAN	na	0	22	85	66	52	33	24	103	108	493
	Asia Region	2	6	117	161	160	482	210	246	477	542	2,403
	Global	5,979	5,605	6,775	6,254	7,285	6,660	6,631	5,728	8,653	9,839	69,409
Exports	Malaysia	na	na	na	na	na	na	2	0	0	0	-
	Singapore	na	na	na	2	10	0	11	0	0	0	23
	Thailand	na	na	na	18	0	0	0	0	0	10	28
	<i>Subtotal</i>	<i>na</i>	<i>na</i>	<i>na</i>	<i>20</i>	<i>10</i>	<i>0</i>	<i>13</i>	<i>0</i>	<i>0</i>	<i>10</i>	<i>51</i>
	ASEAN	na	na	na	20	10	0	258	0	1	10	299
	Asia Region	597	1,374	1,402	1,914	1,472	1,208	1,475	1,602	1,615	3,162	15,821
	Global	7,953	10,575	13,195	11,784	12,836	11,279	13,135	11,874	13,562	15,522	121,715
Shark Meat (Frozen)												
Imports	Malaysia	27	24	41	36	20	28	77	23	21	18	315
	Singapore	na	na	na	1,401	954	1,326	1,473	1,443	1,447	1,793	9,837
	Thailand	531	462	614	390	415	316	114	187	210	166	3,405
	<i>Subtotal</i>	<i>558</i>	<i>486</i>	<i>655</i>	<i>1,827</i>	<i>1,389</i>	<i>1,670</i>	<i>1,664</i>	<i>1,653</i>	<i>1,678</i>	<i>1,977</i>	<i>13,242</i>
	ASEAN	558	486	655	1,827	1,391	1,670	1,664	1,654	1,681	1,994	13,580
	Asia Region	3,733	3,486	4,149	6,831	6,263	6,701	4,957	6,826	12,190	11,261	66,397
	Global	19,366	20,495	21,413	28,972	29,907	32,940	37,980	36,864	46,522	63,551	338,010
Exports	Malaysia	48	8	23	34	28	35	126	28	1	0	331
	Singapore	na	na	na	1,870	1,624	1,566	1,450	1,860	1,671	1,415	11,456
	Thailand	70	0	102	3	198	na	0	95	0	103	571
	<i>Subtotal</i>	<i>118</i>	<i>8</i>	<i>125</i>	<i>1,907</i>	<i>1,850</i>	<i>1,601</i>	<i>1,576</i>	<i>1,983</i>	<i>1,672</i>	<i>1,518</i>	<i>12,358</i>
	ASEAN	3,184	8,301	5,491	10,156	2,640	3,955	3,044	2,382	1,813	1,544	42,510
	Asia Region	5,750	9,761	7,237	12,666	5,323	7,156	6,337	6,586	7,488	8,586	76,890
	Global	19,937	23,935	20,979	33,142	27,899	34,862	37,665	35,059	43,845	42,629	319,952

Notes:

ASEAN countries include Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. The Asia regional total is based on the FAO-defined set of Asian countries.

Table 4.2 Import and export quantities in metric tonnes for shark fins, 1992-2001 (FAO 2003a).

		1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Sum '92-'01
Shark Fins (Dried, Salted or Unsalted)												
Imports	Malaysia	221	165	238	123	396	122	90	132	57	72	1,616
	Singapore	1,066	1,133	1,230	983	931	na	na	na	na	na	5,343
	Thailand	60	100	127	137	138	83	42	98	66	81	932
	<i>Subtotal</i>	<i>1,347</i>	<i>1,398</i>	<i>1,595</i>	<i>1,243</i>	<i>1,465</i>	<i>205</i>	<i>132</i>	<i>230</i>	<i>123</i>	<i>153</i>	<i>7,891</i>
	ASEAN	1,352	1,401	1,597	1,249	1,480	303	252	233	256	198	8,321
	Asia Region	10,467	9,980	10,830	8,713	13,836	13,409	12,864	13,464	16,581	13,992	124,136
	Global	10,809	10,234	11,005	8,885	13,937	13,505	12,940	13,528	16,669	14,046	125,558
	Exports	Malaysia	2	30	18	22	21	31	22	46	10	9
	Singapore	977	869	1,042	871	797	na	na	na	na	na	4,556
	Thailand	18	22	35	61	27	79	139	39	70	61	551
	<i>Subtotal</i>	<i>997</i>	<i>921</i>	<i>1,095</i>	<i>954</i>	<i>845</i>	<i>110</i>	<i>161</i>	<i>85</i>	<i>80</i>	<i>70</i>	<i>5,318</i>
	ASEAN	1,524	1,514	1,751	1,756	1,827	820	392	738	1,246	549	12,117
	Asia Region	3,670	3,800	3,834	2,627	4,873	3,941	3,564	4,025	5,353	3,883	39,570
	Global	4,262	4,416	4,403	3,408	5,421	4,352	4,266	4,524	6,049	4,551	45,652

Notes:

ASEAN countries include Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam.

The Asia regional total is based on the FAO-defined set of Asian countries.

Although not contained in FAO database, Singapore's shark fin import & export quantities for 1997-2001 can be found in Table 4.3 under 'Fins, dried' of this report.

entrepôts, and processors located within Asia, and does not necessarily suggest that all shark products derive from Asian waters.

These comparisons have highlighted the importance of Singapore as an entrepôt for trade in shark products despite the absence of Singapore trade data in the FAO database since 1996. In many of the years examined, Singapore dominated reported ASEAN imports and exports of shark meat products, but these quantities represented only a small portion of global trade. For years in which its figures were reported (1992-1996) Singapore also dominated ASEAN shark fin imports and exports, and in contrast to the shark meat trade, Singapore's trade quantities are large relative to global totals. The role of Malaysia and Thailand in the shark meat and fin trade in recent years, both within ASEAN and globally, appears to be small based on reported figures.

4.2 Detailed Analysis of Trade Volumes in Malaysia, Thailand and Singapore

As illustrated by the preceding discussion, gaps in the data for the countries of interest (e.g. some meat data for Malaysia and some fin data for Singapore) limit the ability to draw definitive conclusions about the volume of trade in these countries. In addition, the commodity categories used in the FAO dataset do not distinguish between processed and unprocessed, and wet and dry, forms of shark fins and thus will not necessarily provide an accurate picture of trade volumes. For these reasons, this section uses national customs data for the three countries to characterize trends in trade by each product reported in the national databases.

4.2.1 Malaysia

Malaysia's customs data for two forms of shark meat (fresh and frozen) and three forms of shark fins ('shark fins, dried, whether or not salted but not smoked', 'shark fins, salted but not dried or smoked and in brine' and 'shark fins') are shown in Table 4.3 (Anon. 1998, Anon. 1999a, Anon. 2000, Anon. 2001, Anon. 2003a). Exports of domestic goods and re-exports of transshipped goods are combined into a single export figure for each product in each year. According to Chen (1999) the first and second categories represent dried shark fin and the third category is the simplified name for a former commodity code describing prepared shark fin. In accordance with Chen (1999), and given that the third commodity code begins with the prefix '1604' indicating a processed product, this category is assumed to contain processed shark fin in either wet or dry form. Furthermore, despite the possibility that frozen fins may be classified as frozen shark meat (see Section 3.2), the second category (i.e. 'salted') is assumed to contain frozen fins. This is for two reasons: 1) the presence of frozen shark fins exported from Singapore and imported to Malaysia is confirmed by the Singapore statistics (Anon. 2003c); and 2) a similarly labeled commodity category in Hong Kong (i.e. 'salted') is used to refer to frozen fins (Clarke and Mosqueira 2002). Assuming frozen fins weigh four times as much as the equivalent dried quantity (Clarke 2003) requires that recorded imports or exports of unprocessed frozen fins be divided by four before being added to unprocessed dried fin weights.

Fresh and frozen shark meat products can be summed without adjustment as both products are assumed to have a similar water content and thus are already standardized. The fresh shark meat trade data given in Table 4.3 confirms that the unreported FAO data for imports and export of fresh shark meat (Table 4.1) is in fact negligible, and the frozen shark meat trade data (Table 4.3) is broadly consistent with the frozen meat data reported by FAO (Table 4.1). Comparison between the Malaysia national data and FAO data for shark fin trade also indicates a close match. However, it is not clear whether only fins in the 'dried' category are reported to FAO since between 1997 and 2001 the majority of Malaysia's traded fins were in this category. Once FAO figures for 2002 become available, a comparison for this year will indicate whether fins recorded in the 'salted' category are compiled since 2002 is the first year in which 'salted' fins were imported and exported in substantial quantities (Table 4.3).

Table 4.3 National import and export statistics for shark meat and fins in metric tonnes, 1997-2002.

Country	Product Form	1997	1998	1999	2000	2001	2002
<i>Imports</i>							
Malaysia	Meat, Fresh	<0.1	0	0	0	0	0
	Meat, Frozen	28	66	23	21	16	12
	Meat, Reported Total	28	66	23	21	16	12
	Fins, Dried	122	87	101	56	65	28
	Fins, Salted	0.2	0	0	1.2	0.8	35
	Fins, Prepared	1.7	0.6	4	0.1	0.4	2
	Fins, Reported Unprocessed Total	122	87	101	57	66	63
	Fins, Adjusted Unprocessed Total	122	87	101	56	65	37
Singapore	Meat, Fresh	52	34	24	102	109	140
	Meat, Frozen	1,334	1,482	1,443	1,448	1,792	1,519
	Meat, Reported Total	1,386	1,516	1,467	1,550	1,901	1,659
	Fins, Dried	820	538	692	629	507	632
	Fins, Prepared	72	48	402	541	406	784
	Fins, Reported Unprocessed Total	892	586	1,094	1,170	913	1,416
	Fins, Adjusted Unprocessed Total	838	550	793	764	609	828
	Fins, Adjusted plus Indonesian exports	1,207	643	948	936	682	992
Thailand	Meat, Fresh	0	0	0	0	0	0
	Meat, Frozen	316	114	187	210	166	164
	Fins, Dried	83	42	98	66	81	60
<i>Exports</i>							
Malaysia	Meat, Fresh	0	4	0	0	0	0
	Meat, Frozen	35	158	32	12	7	25
	Meat, Reported Total	35	162	32	12	7	25
	Fins, Dried	31	29	50	15	7	7
	Fins, Salted	0.3	0.6	0.6	0.3	1	9
	Fins, Prepared	0	12	0.6	5	1	4
	Fins, Reported Unprocessed Total	31	30	51	15	8	16
	Fins, Adjusted Unprocessed Total	31	29	50	15	7	9
Singapore	Meat, Frozen	1,516	1,455	1,860	1,670	1,416	974
	Fins, Dried	593	406	581	548	447	613
	Fins, Prepared	24	44	164	419	180	377
	Fins, Reported Unprocessed Total	617	450	745	967	627	990
	Fins, Adjusted Unprocessed Total	599	417	622	653	492	707
Thailand	Meat, Fresh	0	0	<1	0	10	104
	Meat, Frozen	<1	0	95	0	103	7
	Meat, Reported Total	<1	0	95	0	113	111
	Fins, Dried	78	139	39	71	61	34

4.2.2 Singapore

Singapore publishes shark meat in two categories ‘dogfish and other sharks frozen excluding livers and roes’ and ‘dogfish and other sharks fresh or chilled excluding livers and roes’, but has reported no exports in the latter category since 1997 (Anon. 1999b, Anon. 2002, Anon. 2003b, Anon. 2003c). Quantities of traded shark meat reported in Table 4.3 for Singapore closely match those given by FAO for Singapore in Table 4.1. However, other traded shark products in live, dried/salted, and fillet forms are recorded as shark-derived in internal Singapore databases but when published are aggregated in general categories (Anon. 2003c). Quantities in these shark-specific, unpublished categories are small with the exception of substantial volumes of shark fillets in fresh/chilled (50 to 60 mt per annum imports, negligible exports) and frozen (1,000 to 1,600 mt per annum imports, 100 to 600 mt per annum exports) forms which are presumably included in generic ‘fish fillets’ categories. These unpublished quantities further accentuate Singapore’s position as a regional entrepôt for trade in shark meat products.

Shark fin trade data for Singapore are published in two categories, 'sharks' fins dried whether or not salted excluding smoked' and 'sharks' fins prepared ready for use', but more detailed records (Anon. 2003c) indicate that quantities reported in the latter category consist of both frozen (99%) and canned (1%) forms. It is thus assumed that all shark fin quantities published in the prepared category are in fact unprocessed frozen fins. Unadjusted shark fin imports and exports from the Singapore dataset (Anon. 1999b, Anon. 2002, Anon. 2003b) are shown to fluctuate around levels shown in the FAO data for Singapore in the early and mid 1990s (Table 4.2) with the lowest figures in recent years (Table 4.3) occurring in 1998 (586 mt) at the time of the Asian financial crisis in late 1997 to early 1999 (Wang 1999). Adjusted figures for Singapore's shark fin imports and exports (Table 4.3) have been calculated by applying the adjustment factor of 0.25 to the reported weight of prepared (assumed to be frozen) shark fin, and adding reported exports from Indonesia to Singapore (since Singapore does not report imports from Indonesia; Table 3.1). These data demonstrate that with increasing trade in frozen forms of shark fins during this time period, the total reported (unadjusted) quantities of shark fin traded by Singapore are inflated by up to 40% due to water content.

4.2.3 Thailand

Quantities of shark products traded by Thailand are recorded consistently in the Thai national statistics and the FAO statistics (Tables 4.2 and 4.3)⁴. No adjustments are possible for Thailand's shark fin customs statistics given that processed and unprocessed, and dried and frozen, forms cannot be distinguished within the single commodity code used by Thailand for shark fin (Anon. 2003d).

4.2.4 Summary

Unadjusted national trade statistics for shark meat (Table 4.3) have in the majority of cases closely matched figures given by FAO (Tables 4.1 and 4.2) thus confirming that available FAO figures for Malaysia, Singapore and Thailand accurately reflect the shark trade in these countries. However, the absence in the FAO dataset of Singapore shark fin data since 1996 causes the FAO figures to substantially under-estimate the ASEAN contribution to both imports and exports of shark fins, as well as the total global quantity of shark fin imports (Table 4.2). This is because Singapore has imported an average of 1,000 mt of unprocessed fins per annum between 1997 and 2002 (unadjusted figures), and if included in the FAO figures for 1997 to 2001 (Table 4.2), these additional imports would increase the global shark fin import tally by 15 to 25%. Therefore, as a result of the non-reporting of Singapore, the FAO dataset does not accurately portray regional and global trade levels for shark fin.

This comparison between FAO and national customs databases has shown that national statistics arguably provide the most up-to-date, accurate and detailed sources of trade information for the three countries of interest. However, product form and commodity code differences between national systems can impede meaningful comparison of trade data between countries. For example, since shark fins are traded in a variety of forms, systems such as the FAO database, which do not distinguish between these different forms and double count fins imported to more than one country are likely to misrepresent total traded quantities. As described above, trade statistics from Malaysia, Singapore and Thailand can be adjusted using logical assumptions and conversion factors to produce standardized estimates of traded quantities (Table 4.3). These methods are now used in the following section to extend this analysis to other major shark fin trading countries in order to estimate global trade volumes and thus characterize each of these three countries' share of the global trade.

⁴ Thailand's foreign trade statistics for 2001 onward are available online at <http://www.customs.go.th> but when accessed for this study in October 2003 gave erroneous, nil figures for frozen shark meat imports and exports. The figures given in Table 4.3 are derived from Anon. (2003d) and match those in the FAO dataset (Table 4.2).

4.3 Global comparison

Establishing any individual country's share of global trade requires an unbiased estimate of the individual country's trade as well as a similar unbiased global estimate. The individual country estimates for the shark fin trade in Malaysia, Singapore and Thailand are provided in Table 4.3 but for the reasons given above, the FAO tally of shark fin imports does not accurately represent the global level of trade. An unbiased estimate of world trade should be based only on imports of unprocessed fins to avoid double counting the same fin twice in unprocessed and processed form. Furthermore, double counting of unprocessed fins passing through more than one country before processing (and thus being counted as an import twice) should also be avoided. Finally, unprocessed fins should be adjusted for water content, where possible, to provide estimates based on a standardized dried form.

The task of compiling a global estimate of shark fin trade volume is considerably facilitated by the concentration of the trade in a handful of Asian countries. China, Hong Kong, Singapore, Taiwan and Malaysia are believed to control nearly 90% of the dried shark fins traded in international markets (Ferdouse 1997). Hong Kong, Mainland China and Singapore represent the major shark fin trading centers but report no substantial catch of sharks (FAO 2003a), therefore imports were tallied for each of these three areas excluding imports from the other two to avoid double counting of fins. (For example, any unprocessed fins passing from Hong Kong to Singapore were first recorded as imports in Hong Kong, therefore they must be excluded from the Singapore estimates to avoid double counting). Major shark fishing nations that are also key shark fin markets, i.e. Taiwan and Japan, were also included in the analysis (Chen et al. 1996, Sonu 1998). For these countries, imports were tallied in the same manner as for the entrepôts (i.e. subtracting the other countries' shares), but exports were also included to account for excess domestic production entering the trade. Although available data do not suggest that either Malaysia's or Thailand's shark catches or shark fin consumption are high relative to the other countries included in the analysis, Malaysia and Thailand were included in the same manner as Taiwan and Japan (i.e. as both producers and traders) to better reflect the regional focus of this study.

The methodology is summarized in Table 4.4. Imports were tallied for the entrepôts by excluding imports for the other two entrepôts, whereas imports for the other producer/trader countries were tallied by excluding imports from all three of the entrepôts ('Yes', top half of the table). Japan does not record any imports of shark fins, therefore exports of the producer/trader countries (other than Japan) to Japan were tallied to account for Japan imports ('Yes', center of bottom half of the table). In addition, all producer/trader country exports to countries other than the entrepôts and each other were included to account for any excess production ('Yes', right side of bottom half of the table). Unfortunately, production of shark fin which is consumed domestically in the producer/trader countries is not recorded in trade statistics and thus cannot be accounted for in this methodology. This factor constitutes a potentially large bias toward under-reporting in Taiwan and Japan, and to a lesser extent, in Thailand and Malaysia.

Table 4.4 Methodology for compiling an unbiased estimate of the total quantity of global trade in shark fins.

Trading Countries (Include imports in tally? (read down columns))								
	Imported to:							
	<i>Singapore</i>	<i>Hong Kong</i>	<i>China</i>	<i>Taiwan</i>	<i>Japan</i>	<i>Malaysia</i>	<i>Thailand</i>	<i>Other countries</i>
from:								
<i>Singapore</i>		No	No	No	na	No	No	No
<i>Hong Kong</i>	No		No	No	na	No	No	No
<i>China</i>	No	No		No	na	No	No	No
<i>Taiwan</i>	Yes	Yes	Yes		na	Yes	Yes	No
<i>Japan</i>	Yes	Yes	Yes	Yes		Yes	Yes	No
<i>Malaysia</i>	Yes	Yes	Yes	Yes	na		Yes	No
<i>Thailand</i>	Yes	Yes	Yes	Yes	na	Yes		No
<i>All other Countries</i>	Yes	Yes	Yes	Yes	na	Yes	Yes	No
Producer Countries (Include exports in tally? (read across rows))								
	Imported to:							
	<i>Singapore</i>	<i>Hong Kong</i>	<i>China</i>	<i>Taiwan</i>	<i>Japan</i>	<i>Malaysia</i>	<i>Thailand</i>	<i>Other countries</i>
from:								
<i>Taiwan</i>	No	No	No		Yes (na above)	No	No	Yes
<i>Japan</i>	No	No	No	No		No	No	Yes
<i>Malaysia</i>	No	No	No	No	Yes (na above)		No	Yes
<i>Thailand</i>	No	No	No	No	Yes (na above)	No		Yes

The total unbiased contribution of each party to global trade is shown in Table 4.5. Where possible, national figures were adjusted to exclude processed fins (Hong Kong and Malaysia only) and correct for water content of frozen fins (Hong Kong, Singapore, Taiwan and Malaysia, see Section 4.2 for correction factor). In cases whether countries report re-exports or re-imports of shark fins, these quantities were excluded on the assumption that such fins would be processed.

Table 4.5 Adjusted national tallies contributing to an estimate of the global trade in shark fins.

	1997	1998	1999	2000	2001	2002
<i>Imports</i>						
Hong Kong	2,270	4,086	4,489	5,501	5,130	4,995
Mainland China	3,941	3,893	3,645	3,960	2,312	2,044
Singapore	612	451	678	645	537	719
Taiwan	11	20	66	130	111	87
Malaysia	57	64	70	26	28	33
Thailand	27	11	37	9	38	11
<i>Exports</i>						
Taiwan	214	211	452	493	662	645
Japan	23	1	2	1	1	2
Malaysia	0	0	0	0	0	0
Thailand	0	118	11	5	5	1
TOTAL	7,155	8,854	9,450	10,771	8,824	8,536

The estimates of the total quantity of shark fins traded per annum from 1997 to 2002 range from 7,155 to 10,771 mt. However, these annual estimates of the global trade in shark fin must be evaluated in the context of several important caveats regarding under-estimation. Firstly, all figures are based on reported data thus any unreported trade, which may be substantial in some cases (Clarke 2004), is necessarily excluded from the estimate. Secondly, since only trade in the largest shark fin markets was included, the actual global trade total would undoubtedly be higher. Thirdly, for customs systems which do not distinguish between processed and unprocessed fin imports and exports, such as Mainland China, Taiwan, Japan, and Thailand, this analysis assumed the declared weights were unprocessed fins. If, however, the declared weights were actually processed fins, the equivalent unprocessed weight could be on the order of three or more times higher (Parry-Jones 1996). Finally, shark fins produced and consumed within a single country (i.e. domestic consumption) are not recorded in trade statistics and are therefore excluded from this estimate.

Biases leading to overestimation may also be present in the database, but these influences are expected to be minimal compared to those underestimation biases discussed above. The main concern in this regard is the assumption in the Mainland China, Japan, and Thailand databases that unspecified fins were dried rather than frozen. If substantial quantities were indeed frozen, the actual quantity of shark fins in those shipments would be overestimated by a factor of four.

Estimates of the percentage of the global trade passing through Malaysia, Singapore and Thailand can be calculated by dividing the adjusted total for each country from Table 4.3 by the global tally above. The numerator in this estimate must be one of the total trade figures given in Table 4.3 rather than the national figures in the rows of Table 4.5 since the latter may arbitrarily discount trade in some entrepôts for the sake of avoiding double counting, i.e. a fin is only counted at its first point of import. The results for 1997-2002 shown in Table 4.6 reflect the proportion of the total trade passing through each of the three target countries regardless of whether any recorded fin is subsequently counted in another country.

Table 4.6 Percentage of the global trade passing through Malaysia, Singapore and Thailand, 1997-2002.

	1997	1998	1999	2000	2001	2002
<i>Malaysia</i>	2	1	2	1	1	1
<i>Singapore</i>	17	7	10	9	8	12
<i>Thailand</i>	2	2	1	1	2	1

Based on available data and the caveats listed above, Malaysia and Thailand appear to be minor players in the international shark fin trade (2% or less of global trade volumes). However, since domestic production and consumption is excluded from this calculation, actual consumption of shark fin in these countries may be higher than indicated by these figures. Singapore annually handles between 7 and 17% of the trade (\bar{x} = 10%). As Singapore does not source shark fins domestically, and thus should not have additional, unreported trade deriving from domestic production, these figures for Singapore are expected to more accurately represent the scope of its market than those for Malaysia and Thailand. The degree to which shark fin traded through each country is consumed in that country is explored in the following section.

5 PRODUCT DISPOSITION

This section analyzes the disposition of shark products traded through Malaysia, Singapore and Thailand, in order to characterize each market's mix of export and domestic consumption. A description of potential factors influencing market demand in the region, and a discussion of whether available shark fin price data determine or reflect demand, is also provided.

5.1 Analysis of Exports and Domestic Consumption

A common means of assessing consumption of traded products is to compare imported and exported quantities and assume that the amount by which exports exceed imports is production (discussed in Section 3) and the amount by which imports exceed exports is domestic consumption (Kreuzer and Ahmed 1978). The following discussion draws inferences about consumption where possible based on the available data for Malaysia, Singapore and Thailand. Export markets, either for domestically produced goods (exports) or transshipped goods (re-exports), are also characterized based on customs data.

5.1.1 Malaysia

Based on national data shown in Table 4.3, Malaysia's trade in fresh shark meat is negligible. Trade in frozen shark meat is greater, but since exports exceed imports in most years, and Malaysia also produces shark meat domestically, it is not possible to estimate domestic consumption from trade figures. According to Ali and Isa (2002) meat is sold in fresh or dried forms but only five species (*Carcharhinus falciformis*, *C. limbatus*, *C. macroti*, *C. sorrah* and *Scoliodon laticaudus*) are considered palatable. Malaysia's exports of frozen shark meat are primarily destined for China (>50% in 4 out of 6 years).

Between 1997 and 2001, most shark fins were traded in the 'dried' category, and imports exceeded exports in this category by 40-90 mt per annum. In 2002, the first year to record substantial quantities of shark fin in 'salted' form, the difference between 'dried' imports and exports was just over 20 mt but an additional 35 mt were recorded as 'salted' imports, and if added to the dried imports, places the unadjusted import tally for 2002 within the range of the preceding years. In combination, these annual figures suggest that Malaysia consumes at least several dozen metric tonnes of imported unprocessed shark fin per year in addition to any shark fin produced locally for the domestic market and very small quantities of imported processed fins.

Countries receiving greater than 5,000 mt per annum of dried unprocessed shark fin exports from Malaysia between 1997 and 2002 include Thailand, Singapore and Hong Kong. Based on trader interviews, it is likely that most unprocessed exports of shark fin originate from East Malaysia (Sarawak and Sabah) and are exported directly without passing through West Malaysia. Processed shark fin exports from Malaysia during these years were only destined for Singapore and Hong Kong.

5.1.2 Singapore

As demonstrated in Section 4, Singapore's role in the trade of shark meat is large relative to the ASEAN volume of trade but small relative to global figures. Between 1997 and 2002 Singapore consistently directed substantial volumes (>200 mt per annum) of frozen shark meat exports to Italy, one of the world's largest importers (see Section 2) and to South Korea. Similar quantities were recorded in some years to Taiwan, the Netherlands and Greece. Comparison of import and export quantities for frozen shark in these years shows a fluctuating trend encompassing several hundred mt of production in some years (see Section 3), nearly equal quantities in 1998, and an apparent domestic consumption of almost 550 mt in 2002. Singapore does not export fresh or chilled sharks, therefore all fresh meat imports are assumed to be for consumption. These products derived primarily from Malaysia and totaled 25 to 140 mt per annum.

Singapore was recognized as a burgeoning shark fin entrepôt as early as the mid 1970s, and at that time the volume of retained imports had declined to 415 mt or 45% of the trade (Kreuzer and Ahmed 1978). A comparison of Singapore's adjusted shark fin imports to exports ratio between 1997 and 2002 shows a surplus of imports of 110 to 240 mt per annum. In comparison to the previous figures, this indicates a reduced and fairly stable level of domestic consumption representing 15-30% of traded quantities (based on adjusted figures). A trader cited in Chen (1996) estimated that 500 mt of shark fin are consumed in Singapore each year and Ferdouse (1997) reported consumption figures of 100-200 mt per annum. Trader surveys conducted for this study indicated that domestic consumption is now estimated to be approximately 300-400 mt per annum. Presumably these consumption estimates apply to processed fins which can be converted to unprocessed equivalent weights using a factor of 3 (Parry-Jones 1996). Therefore consumption estimates of 100-500 mt per annum in Singapore would equate to 300 to 1,500 mt of unprocessed shark fin per year. This range of estimates is also in line with Singapore's reported shark fin production figures between 1997 and 2001 (100 to 500 mt per annum according to FAO (2003a)), assuming this quantity is given in processed fin weights, and that, due to cost, fins processed in Singapore are destined for domestic consumption. Singapore imports more canned shark fin (25 to 75 mt per annum) than it exports (8 and 30 mt per annum), but after adjustment for packaging and other constituent weight, the quantity of shark fin represented is small and would not appreciably alter domestic consumption estimates (Anon. 2003c).

Those shark fins that are not consumed in Singapore are exported primarily to Hong Kong (240 to 500 mt per annum) and Malaysia (50 to 150 mt per annum) in dried form. Frozen shark meat in quantities greater than 20 mt per annum is exported to Hong Kong, Taiwan, China and Malaysia.

5.1.3 Thailand

Exports of fresh and frozen shark meat from Thailand between 1997 and 2002 were primarily destined for Singapore, China and Hong Kong (> 20 mt in any year). In most years, frozen meat comprised >90% of all exports but the ratio of frozen to fresh exports reversed in 2002 when 94% of exports were declared as fresh shark meat. Thailand consistently imports greater quantities of frozen shark meat than it exports suggesting that domestic consumption is on the order of at least 100-300 mt per annum in addition to quantities of shark meat derived from domestic production.

Domestic consumption of shark fin in Thailand is difficult to determine given that unprocessed shark fin may be both imported and exported, and processed shark fin may also flow both out of and into the country. Assessing consumption on the basis of single commodity code for shark fin is thus problematic. Perhaps because of this, Thailand's annual production to consumption ratio fluctuates substantially with the highest apparent consumption (i.e. imports – exports) of nearly 100 mt in 1998. The major recipients of exports of shark fin from Thailand (consistently >5mt per annum) are Hong Kong and Singapore.

5.1.4 Summary

As illustrated by the preceding discussion, this method of estimating domestic consumption can oversimplify a complex trading system involving multiple product forms. The methodology is particularly difficult to apply to countries which both produce and consume shark products, such as Malaysia and Thailand. The case for Singapore's consumption of shark fins is clearer suggesting that between 100 and 500 mt of processed shark fins per year are consumed, equating to 300 to 1,500 mt of unprocessed fins or 3 to 21% of the estimated global trade over the years 1997-2002.

Export routes for shark meat and fins that are not consumed domestically within Malaysia, Singapore and Thailand are summarized in Figure 5.1. These illustrated routes are consistent with a pattern of consolidation of products from Southeast Asia in Singapore before shipment to a variety of receiving countries mostly located in East Asia. However, Malaysia and Thailand also export shark products directly to Hong Kong and Mainland China and this trade is expected to increase as the Mainland economy develops and trade links expand.

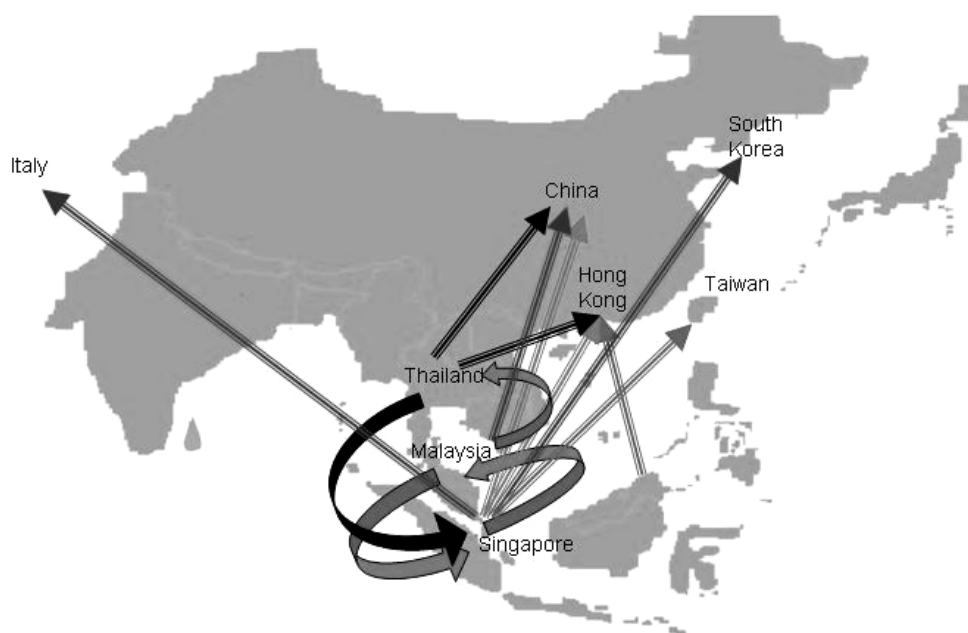


Figure 5.1 Major export destinations for shark meat and fins from Malaysia, Singapore and Thailand. Red arrows indicate shipments of meat, blue arrows indicate shipments of fins, and black arrows indicate shipments of both meat and fins. Curved arrows represent trade within ASEAN whereas straight arrows represent non-ASEAN trade. Criteria for 'major' export destinations vary between Malaysia, Singapore and Thailand and are given in the text.

5.2 Market Demand

The proportion of the shark product trade servicing domestic consumption in Malaysia, Singapore and Thailand depends directly on the strength of the market in each country. This in turn is believed to depend on a variety of factors including, but not necessarily limited to, overall economic performance, system ‘shocks’ such as the outbreak of Severe Acute Respiratory Syndrome (SARS), and standard seasonal patterns. Once these factors are identified, shark fin price data can be examined to assess whether the influence of these factors can be discerned, and if so whether the market can be characterized as being driven by demand as opposed to supply. Due to limited economic data for other shark products, this discussion is focused on shark fins only.

Shark fin is known to be a luxury good consumed on celebratory occasions such as weddings and at high profile business functions (Vannuccini 2000). By definition, demand for luxury goods is more susceptible to changes in income than other non-luxury goods such as dietary staples (Eastwood 1985). For example in this case, when consumers have more money to spend they would tend to purchase more shark fin whereas their demand for soya sauce (醬油, *jiang you*) may remain constant. The reverse should also be true: if income decreases, lesser quantities of shark fin should be consumed. Changes in demand may be related to actual income, or a combination of actual income and consumer propensity to spend thereby incorporating a broad range of factors influencing economic sentiment.

Surveys of shark fin traders in Hong Kong identified a downturn in the economy in 2001 as a major influence on consumer demand and thus sales (Clarke 2004). This downturn extended into 2003 and coincided with the occurrence of Severe Acute Respiratory Syndrome (SARS) outbreaks in several of the key shark fin markets (i.e. Mainland China, Hong Kong, Singapore and Taiwan) in April and May 2003. According to a Singapore Department of Statistics survey, restaurant receipts declined by 50% in April 2003, the height of the SARS period, as compared to March 2003 (Straits Times 2003). Traders in Malaysia, Singapore and Thailand interviewed for this study in autumn 2003 specifically cited the poor performance of the economy, and traders in Singapore and Thailand mentioned SARS, as factors which have directly suppressed local demand by residents, or indirectly impacted restaurant sales to foreign visitors through a decrease in tourist arrivals. The SARS episode would be expected to have had a more severe, though shorter-term impact on sales, whereas the poor economic situation is part of a longer term trend.

Another factor believed to influence shark fin markets is the traditional seasonal patterns of consumption. Several authors have identified that the cool weather months of fall to early spring are the months of highest demand either because they are the favored months for weddings or because a number of holidays celebrated by the Chinese (e.g. Winter Solstice, Christmas, New Year and the Chinese (Lunar) New Year) fall within this period (Lai 1983, Fong and Anderson 2000). In order to determine whether imports of shark fins increased in preparation for the peak winter months on a regular basis, imports to Hong Kong were examined on a monthly basis over a period of three years, but no consistent patterns were apparent (Clarke 2003). In this case, the existence of seasonal patterns in sales of shark fins may be obscured in import statistics by the practice of stockpiling processed or unprocessed fins.

The only known standardized, publicly available dataset on shark fin prices is compiled by INFOFISH, a partner within the FAO-initiated GLOBEFISH international network, providing marketing information and technical advisory services for fishery products in the Asia and Pacific region. INFOFISH’s biweekly bulletin of wholesale prices for various fisheries products includes data for shark fin consisting of product form and grading, indicative price, market area (i.e. point of sale) and product origin (INFOFISH 2003). Each price data point is

based on a quoted price in a given market for a given form or grade of the product, originating from a particular country. While prices are standardized in US dollars, the nomenclature of the products follows the custom of the originating country and thus commodity categories and gradings are often inconsistent from one entry to the next. Also, many of the quoted prices are marked as 'c&f' (cost and freight) and represent the price to be paid by the buyer at the receiving port. Since freight charges will vary based on the distance between the origin and the destination market, only c&f prices for the same product, originating and arriving at the same ports can be validly compared.

Monthly shark fin price quotes were compiled from published INFOFISH newsletters from January 1990 through July 2003. Accounting for the inconsistencies discussed above resulted in a focus on three types of shark fins, 'ocean white', 'blue' and 'mako' described as 'half moon cut', i.e. trimmed of attached tissue (Lai 1983), full fin sets delivered to Singapore from the South Pacific. Prices quoted in US dollars beginning in January 1997 (the earliest reported data point) were adjusted using US dollar inflation rates (Anon. 2003g) calculated from a base period of July 2003.

The adjusted time series shows consistent trends for the highest priced (ocean white), medium priced (blue) and lowest priced (mako) fins (Figure 5.2). Prices for all three types of fins were constant in 1997 but began to decline precipitously in early 1998 at the time of the Asian financial crisis which began in late 1997 and lasted through early 1999 (Wang 1999). Ocean white and blue shark fin prices began to rebound in early summer 1999, but mako shark fin prices remained low throughout 1999. Despite a brief correction after the Chinese (Lunar) New Year in 2000, prices for all fins continued to rise until early 2001 when prices fell sharply again at about the time the onset of the current global economic downturn was acknowledged. Since that time prices have fluctuated within a small range, generally 25% lower than the 1997 level. The final three data points in the series reflect the post-SARS months of May through July 2003, but aside from a slight dip in price of ocean white fins, no major price shifts were observed during this period. One possible explanation for the lack of price changes due to SARS could be that overseas shark fin dealers, who provide these data, were content to hold their stocks of shark fins without lowering the price in anticipation of a rapid return to normalcy post-SARS. Overall, the price data suggest that the short-term effects of SARS had little impact on the shark fin industry, but that longer-term, and more widely distributed economic trends may have dampened consumer demand and encouraged traders to lower prices in order to clear inventories.

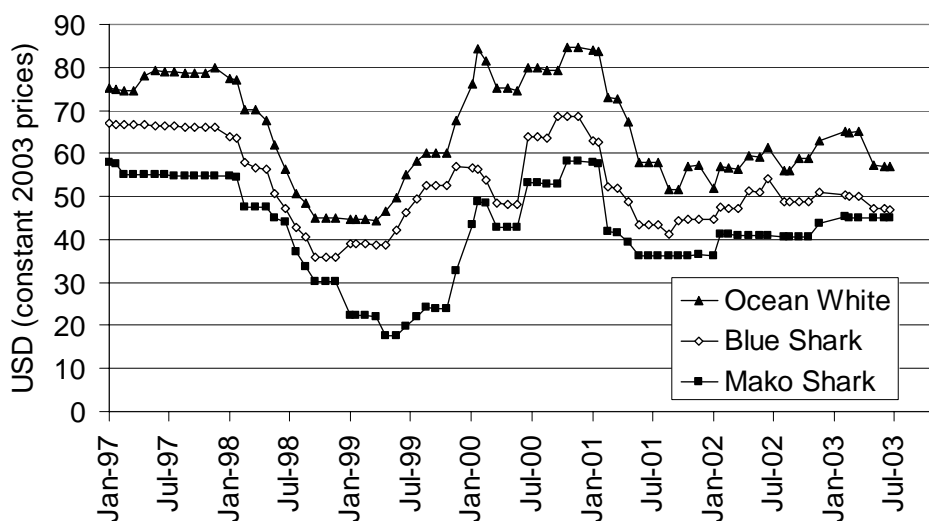


Figure 5.2 Prices for half-moon cut, whole sets of three types of shark fins originating in the South Pacific and shipped to Singapore (price includes freight charges) in US dollars adjusted to a constant price based on the value of the US dollar as of July 2003.

6 TRADE CHARACTERISTICS

The preceding discussion has broadly characterized the demand for shark fin in Southeast Asia based on factors which affect the region as a whole. Where relevant to the particular topics of analysis, information from a total of 13 interviews conducted with importers, processors and retailers in Malaysia, Singapore and Thailand has been integrated into the preceding discussion. This section describes the interview findings in more detail and provides a market-by-market description highlighting information particularly relevant to each location. Since none of the interviewed dealers traded shark meat, the contents of this section focuses exclusively on shark fins.

6.1 Malaysia

Field visits were conducted in the Kuala Lumpur and Pulau Pinang areas with the assistance and facilitation of the Malaysia Fisheries Department. Five interviews were conducted with importers, processors and retailers, and price information was obtained from vendors in Pasar Seni, the central market area of Kuala Lumpur, and Georgetown, Pulau Pinang. Several large companies dealing in shark fin products were identified in both areas but these refused to participate in interviews for various reasons. With one exception, interview participants either did not specialize in shark fin or were no longer actively engaged in the industry. Observed or quoted prices are converted to US dollars using the exchange rate of 3.8 RM to 1 USD.

6.1.1 Products, Species, Grades and Prices

Information on species used and wholesale prices was obtained from one Malaysian processor. This trader stated that *Carcharhinus dussumieri*, *C. sorrah*, *Scoliodon laticaudus*, and *Rhynchobatus djiddensis* were used in his business. However, since a guide to Indian seafood species was used to identify these sharks and rays, and given that the number of elasmobranchs illustrated in the guide was very limited (< 10), this species list should be considered indicative rather than definite. This processor described four grades of shark fin marketed by his firm, all of which were packed in plastic pouches in liquid and frozen for wholesale, as follows:

- 'L' grade consisting of 85% 'blacktip' shark fin and 15% artificial shark fin for 11 RM (3 USD) per kg;
- 'SP1' grade consisting of 85% small dogfish fins and 15% artificial shark fin for 13 RM (3.5 USD) per kg;
- 'SP5' grade consisting of 85% large dogfish fins and 15% artificial shark fin for 100 RM (26 USD) per kg;
- 'LLL' grade consisting of 100% guitarfish fins for 150 RM (40 USD) per kg.

A wholesaler in the Kuala Lumpur area was also interviewed and quoted prices for two types of frozen processed shark fin in plastic pouches at 67 RM (18 USD) per kg for medium thick fin needles and 83 RM (22 USD) per kg for thick fin needles. This dealer stated that he did not mix real and artificial shark fin in any of his products, however he sells pouches of artificial shark fin, produced in Japan, for 5 to 10 RM (1 to 3 USD) per kg and restaurants can create their own mixtures.

In Pasar Seni, Kuala Lumpur several dried seafood and other dried foodstuff vendors were observed, but only one carried processed shark fins and only two offered dried shark cartilage for sale. Given the number of shops selling fish maws, the number of vendors dealing in shark products was surprisingly low. No information on species was obtained but the following retail prices were observed:

- Dried processed shark fin cartilage or vertebral cartilage (packaged separately, i.e. not mixed) at 60 RM (16 USD) per kg;

- Very small (5 to 8 cm) dried processed whole shark fins at 980 RM (258 USD) per kg;
- Medium-sized (15 cm) dried processed whole shark fins at 1,380 RM (363 USD) per kg;
- Large-sized (20 cm) dried processed whole shark fins at 1,780 RM (468 USD) per kg; and
- Extra large-sized (35 cm) dried processed whole shark fin (rays) at 2,100 RM (553 USD) per kg.

The stock of shark fins on hand in this shop consisted of only a few kilograms and these were not prominently displayed, suggesting that demand by retail shoppers is not particularly high. Relative to shark fins, greater amounts of dried shark cartilage were stocked but this was still a minor product among the range and quantity of goods on display.

In Georgetown, the only shark fin product observed in shops was dried low grade loose fin needles shaped to resemble a whole fin and packed in plastic (Figure 6.1). These fin ‘nests’ were retailing for 28 RM per 50 grams or 147 USD per kilogram.



Figure 6.1 Dried low grade loose fin needles shaped to resemble whole fins and marketed as fin ‘nests’ or ‘baskets’. (Photo: Tan Sen Min, SEAFDEC MFRD)

6.1.2 Trader and Consumer Attitudes

None of the interview participants in Malaysia were aware that shark species had been listed on the appendices to the Convention on Trade in Endangered Species of Wild Fauna and Flora (CITES) (Anon. 2003h). However, most were familiar with campaigns against shark finning through cable television programs aired in Malaysia. None of those expressing an opinion on the influence of these campaigns believed that environmental or animal welfare concerns were having any impact on their business. One trader suggested that such concerns would never exert a strong influence on a trade as widely distributed and diversified as the shark fin trade.

All respondents except one noted that sales had declined due to the ongoing economic downturn, with one processor citing a decline of 40% over last year. One retailer claimed that shark fin was becoming ‘more and more popular’ and mentioned that sales were typically brisk from September (an auspicious month for Chinese weddings) through Chinese New Year and during this period prices could rise by 200 to 400%. Both processors mentioned the increasing

acceptance of mixtures of real and artificial shark fin by the market due to improved quality of the artificial product and consumers' desire for lower prices during the current recession. One of these respondents believed that shark fin might be losing its appeal as consumers grow bored and turn toward new products.

The consensus view of the Malaysian traders was that relative to the China market, the market for shark fin in Southeast Asia is small and locally orientated, and uses poorer quality fins. One processor complained that Mainland China buyers were fiercely competing for raw fins all over the world, and another former processor explained that his factory in Indonesia had folded because the quality of his product could not meet the high standards required by the China market. Competition among traders aside, most respondents did not consider that the supply of shark fins was either increasing or decreasing with time although some mentioned the political instability in Aceh, Indonesia and impacts of marine pollution in coastal areas as negative influences on fin supplies. None of the participants carried any shark products besides fins. The processors stated that shark meat was always fully utilized (specifically in Indonesia), but that there were no markets for skin, cartilage or liver oil produced by the source fisheries.

Although most respondents stated that the shark fin trade in Malaysia was based in Kuala Lumpur and Pinang, this survey did not cover the East Malaysia provinces of Sarawak and Sabah and cannot assess the extent of the shark fin trade in these areas. However, most of the interviewed traders stated that their raw materials were derived almost exclusively from imports, not from East Malaysia. Shark landings have been documented as higher in East Malaysia (Ali and Isa 2002), but it is likely that any fins derived from these landings are directly exported to Hong Kong or China without passing through one of the Southeast Asian trading centers (see Suzuki 2002).

6.2 Singapore

The interview program in Singapore consisted of five individual interviews and two group interviews with members of the Singapore Marine and Land Products Association (Hai Swee Kow Kong So). Meetings were facilitated by the Agri-Food and Veterinary Authority (AVA) of the Singapore Government which maintains close contact with trade organizations through their role in regulating food safety. The individual interview participants consisted of importers and processors, some of whom are believed to represent key companies in the Singapore market. Group interviews with members of the trade association were advantageous in their potential to gather the opinions of large number of traders simultaneously. However, one of the drawbacks of this interview format is that the information offered tends to be generalized in order to avoid revealing confidential business details in an open forum with potential competitors present (Martin-Smith et al. 2003). In addition to the interviews, price quotes for retail products were obtained from three Singapore vendors and translated to US dollars at the rate of 1 USD = 1.75 Singapore dollars (\$).

6.2.1 Products, Species, Grades and Prices

Information on the species of sharks used in the Singapore market was compiled from several interviews, but no confirmatory studies were undertaken to verify matches between market categories and actual taxonomy. Interviews indicated that Singapore traders recognize and may use the Chinese trade names for shark fins used in Hong Kong (Clarke 2003, Clarke et al. in press), although the Singapore traders employ different Chinese character pronunciations based on their native dialect. However, traders usually communicate with suppliers using common names familiar in the supplying region, and lacking an auction system as in Hong Kong, do not use standardized trade names to the extent observed in Hong Kong. The most common names cited by shark fin importers are listed in Table 6.1 along with any alternative names known to traders and, where available, indicative prices.

Table 6.1 Types of shark fin used in the Singapore market and their wholesale (W) and retail (R), presumably processed, prices. Dashes indicate information not available.

English Name Given	Alternative Names	Expected Taxonomy	Price
Blue	-	<i>Prionace glauca</i>	-
Black	Wu Yang (五洋), etc.	<i>Carcharhinus</i> spp.	\$170 (97 USD) per kg (R, small size)
White	Qun (群), Bai (白)	Rhinobatidae	-
Thresher	-	<i>Alopias</i> spp.	-
Mako	Ma Jiao (馬交) Hei Qi (黑其)	<i>Isurus</i> spp.	Caudal fin \$300 (171 USD) per kg (R)
Rough Sand	Cu Sha (粗沙)	Orectolobidae (?)	\$80 (46 USD) per kg (W)
Spiny Dogfish	Gou Sha (狗沙)	<i>Squalus acanthias</i>	\$68 (39 USD) per kg (W) \$280 (160 USD) per kg (R)
Velvet Dogfish	You Chi (油翅)	<i>Scymnodon squamulosus</i>	\$45 (26 USD) per kg (W) \$220 (126 USD) per kg (R)
School	-	<i>Galeorhinus galeus</i>	\$200 (114 USD) per kg (W) \$500 (286 USD) per kg (R)
Rig	-	<i>Mustelus lenticulatus</i>	\$68 (39 USD) per kg (W) \$280 (160 USD) per kg (R)
Elephantfish	Da Ben Xiang (大本象)	<i>Callorhincus milii</i>	\$70 (40 USD) per kg (W)
Pearl	Zhen Zhu (珍珠) Chang Ming(長明)	-	-

Retail prices were obtained for a variety of shark fin products in dried form. Fine loose fin needles formed into ‘nests’ retailed for \$19-24 for approximately 60 g (or 197 to 238 USD per kg). Thicker loose fin ray ‘nests’ were priced considerably higher at \$54-62 for 100 g (or 310 to 354 USD per kg). Small whole fins in dried form (10-12 cm in length) sold at \$60 to 165 for approximately 200g and \$400 for 600 g (or 230 to 380 USD per kg). Canned shark fin soup, with an unknown shark fin content, retailed for \$4 to 8 (or 2 to 5 USD).

Singapore processors were found to concentrate on production of shark fin products in a wet form. Small whole fins in this form are referred to as ‘*xiaobaochi*’ (小包翅) and were said to wholesale for \$90 (51 USD) per kg which is substantially lower than similarly sized fins in dried form presumably due to water content (Figure 6.2). Processors noted that whole fins were popular with customers who insisted on 100% real shark fin. Loose fin needles contained in lower grade shark fin products are more susceptible to substitution with artificial shark fin despite regulation by the Singapore government preventing sale of incorrectly labeled shark fin products. Restaurants in Singapore selling shark fin dishes as part of a set banquet menu will offer a low price set menu, including loose shark fin needles in a soup, at \$500 (285 US), and a high price set menu, including small whole fins in a soup, at \$1000 (571 US).

During one of the group interviews traders stated that blue shark fins were the most common type comprising as much as 40 to 50% of the market. An individually interviewed trader described a decrease in profits over the past two decades resulting from an increased awareness among fishermen in the value of fins and a ten-fold or more increase in price ‘at the dock’. One trader discussed the effect of the SARS crisis in detail, commenting that shark fin prices fell by 30% during this period (see Section 5.2).



Figure 6.2 Small processed fins in wet form from a Singapore processing plant.
(Photo: Goh Kian Heng, SEAFDEC MFRD)

6.2.2 Trader and Consumer Attitudes

Most interviewed traders in Singapore were aware that some species of sharks had been listed by CITES, but several appeared unfamiliar with either the actual species listed and/or the requirements for continued trading of these species (i.e. the basking (*Cetorhinus maximus*) and whale (*Rhincodon typus*) sharks) under the requirements of CITES Appendix II. When asked whether they supported further listings of sharks by CITES, several well-informed traders insisted they were neutral on such proposals but preferred sharks to be managed by national authorities under agreements coordinated by FAO. Through utilizing existing channels of communication in Singapore between AVA and shark fin traders, this study was able to inform traders of an important linkage between the current lack of information about the shark fin trade in Southeast Asia and future shark management actions. In particular, all interviews were introduced by explaining that effective management of shark resources cannot occur without information, and a continued dearth of trade data may actually encourage actions by international treaty organizations such as CITES.

Most traders stated they were amenable to, or in some cases even welcoming of, greater future management of sharks, but at the same time considered that the shark fin trade provides important economic benefits to fishermen in developing countries without other sources of income. Some traders questioned whether many, or even any, sharks are finned and then discarded, citing anecdotal evidence of whole shark utilization in several countries including India. Several examples of utilization of shark products other than fins were offered, but of the 19 association members represented by the group interview, only 3 to 4 pursued a limited trade in shark meat or cartilage or skin, and none dealt in shark liver oil.

All individually interviewed traders indicated they would not take any action if more shark species were listed, or they would shift their focus to products that were not regulated. These respondents stated the existing CITES listings of sharks had no effect on their business. In contrast, the group interview with the association responded that the listings have had an impact and stated that if more listings were proposed lobbying would be undertaken on behalf of the trade. The difference in response from within and outside the association highlights the importance of associations in organizing and spearheading lobbying activities.

Given previous and ongoing shark conservation campaigns in Singapore, respondents were asked whether there had been any effect of these campaigns on their business. The group interview with association members and two of the individually interviewed traders

acknowledged that the younger generation's appetite for shark fin had possibly been affected. Other respondents, however, claimed that there was no effect. Despite mixed responses on this question, only one of the traders cited conservation campaigns or international regulations/bans as one of his concerns for the future.

There was consensus among all interview respondents that the poor state of the economy in Singapore had hurt sales. In particular, most traders stressed that the market was driven by demand in China and that only the medium and low grade fins were retained for the local market. All respondents felt that the growing demand for fins in Mainland China was detracting from Singapore's formerly key role as a trade entrepôt. In addition to the economy and the China market, some traders cited SARS, as well as Singapore's rising taxes (such as the 5% Goods and Services Tax) and operating costs, as factors suppressing their trade. Several interview participants were openly pessimistic about the shark fin trade in Singapore calling it a 'dying trade'.

Traders were also asked whether they believed that high quality shark fins were becoming more difficult to obtain. Nominally, many respondents agreed that this was the case, but it became clear that in most cases that this was a result of the increased competition between Singapore traders and traders from Mainland China for shark fin supplies. Most traders maintained that fin supplies were either constant or fluctuating naturally in response to seasonal patterns, shark migrations and/or climatic changes such as global warming. Only one importer mentioned seeing localized effects of over fishing in some countries.

6.3 Thailand

Surveys in Thailand were severely limited by importers' and processors' unwillingness to consent to interviews and by retailers' refusal to respond to even basic questions about their business. The reasons why the shark fin trade in Thailand appeared to be more reticent than in the other countries surveyed in this study may be related to recent shark conservation campaigns publicizing findings of high mercury content in shark fin products (Anon. 2001b). Despite approaching numerous traders both by telephone and in drop-by situations (retailers only) with the facilitation and participation of personnel from the Thailand Department of Fisheries, only one abbreviated interview with a retailer in Bangkok's Chinatown district was conducted. Information on product grades and prices was collected from observations in several shops and restaurants in the same area.

The one interviewed retailer stated that his customers were largely tourists including those from Singapore, Taiwan and Hong Kong. He indicated that business was slow due to the poor economy and a decline in tourist arrivals, although he did not mention the SARS outbreak specifically. According to this source, shark fin goods were sold on consignment, and since the shop owner did not purchase the goods, he had a somewhat distant and fluid relationship with suppliers. The name and address of his supplier(s) would not be divulged, nor could any details of the fin sources or processing be obtained.

Only one of the shark fin products in the observed retail outlets was branded with a label showing a company name. This product was produced by the Kwan Kee company which is headquartered in Hong Kong. (A shark fin and bird's nest restaurant in the area also distributed name cards which also indicated that the parent company was located in Hong Kong.) For the most part, however, brands consisted of circular red labels with a gold embossed picture, e.g. a 'thumb's up', or Chinese characters for 'double happiness', 'star' or 'dragon' (Figure 6.3).



Figure 6.3 Typical packaging of shark fins in the Bangkok market. Prices are quoted per bag rather than per unit weight (see Note 3). (Photo: Tan Sen Min, SEAFDEC MFRD)



Figure 6.4 The most expensive dried processed shark fins observed in the Bangkok market (20,000 Baht (500 USD) per bag). The retailer described the fins as ‘ming’ and indicated they were imported from Africa. (Photo: Tan Sen Min, SEAFDEC MFRD)

Many of Bangkok’s Chinatown retailers stocked shark fin products. Prices for various product forms and grades were observed, and translated to US dollars using a conversion rate of 1 USD=40 Baht, as follows⁵:

- fin ‘nests’ in a standard size of 20 cm by 12 cm for 500 Baht (based on weights observed in Malaysia and Singapore probably equal to 250 USD per kg);
- very small (5 to 8 cm, yellowish, locally caught and processed shark dorsal and pectoral fins for 1,650 to 1,850 Baht per bag (83 to 93 USD per kg);
- small (10 cm, yellowish, locally caught and processed shark dorsal and pectoral fins for 2,700 to 3,000 Baht per bag (135 to 150 USD per kg);
- small (8 to 10 cm, yellowish, locally caught and processed shark lower caudal fins for 3,500 to 4,000 Baht per bag (175 to 200 USD per kg);
- imported high grade, pearly white dried processed fins of up to 20 cm in length for 7,500 Baht per bag (375 USD per kg);
- imported high grade, pearly white dried processed fins of 30 to 35 cm in length (described by the trader as ‘ming’ (明) from ‘Africa’) for 20,000 Baht per bag (1,000 USD per kg (Figure 6.4));
- wet whole fins (小包翅, ‘xiaobaochi’), 7 to 15 cm, ready to eat in a restaurant for 1,500 to 4,000 Baht (38 to 100 USD) per fin;
- bowls of shark fin soup for 300 Baht (8 USD) for a small bowl up to 1,500 Baht (38 USD) for a large bowl (shark fin content not specified).

6.4 Summary

These market observations and interviews have provided insights into how processed shark fin products are graded and priced. Prices were found to be relatively consistent between markets.

⁵ Products in the Bangkok market were priced per pre-packed bag not by unit weight. Given that most bagged shark fin products in Malaysia were priced per 500-600 g, and given that the size of the bags was similar in Bangkok, prices quoted in Thailand per bag have been doubled to produce approximate price per kg figures.

Dried loose fin needles in 'nests' sold for approximately 150 to 250 USD per kg, whereas small (< 10 cm) whole fins in dried form were priced at 200 to 400 USD per kg (with the exception of lower grade offerings in Thailand said to derive from local fisheries). Similarly sized fins in whole wet form were offered at a lower price, 40 to 100 USD per kg, presumably due to water content. Small-sized loose fin needles in wet form are popular with restaurants, but subject to mixing with artificial shark fin, and were priced at 3 to 40 USD per kg.

It was not possible to obtain extensive, reliable information regarding the species used in the shark fin trade due to the apparent absence of a standardized nomenclature within the various trade communities. While Chinese trade names used in Hong Kong were recognized by some traders, most dealers were only familiar with the types of fins common in the supply countries they trade with, and they tended to employ the vernacular names used in these countries rather than applying their own terminology. Furthermore, as market categories are based on the length and thickness of fin needles, shark fins are grouped into categories producing differing grades of fin needles, and thus the number and identity of species in each category is of little practical business interest.

Despite many individual differences in traders' type of operation and market focus, e.g. exporters versus processors in three different countries, common themes in attitudes and outlooks were identified. The majority of interview respondents in all three countries believed the supply of shark fin was steady, and that shark meat was nearly always fully utilized in the source country even though shark skin, cartilage and liver oil markets were underdeveloped. Nearly all respondents attributed the recent downturn in the trade to the ongoing economic recession, and in some cases to SARS (notably not in Malaysia). All traders acknowledged that the Southeast Asian market specializes in lower grade fins because the China market commands the top quality products. Many also expressed concern that the supply of shark fin was becoming increasingly controlled by Mainland buyers and this was in some cases siphoning business away from Southeast Asia. Alongside the dual factors of the economy and China, traders were relatively untroubled by shark conservation campaigns, although traders working in areas which have been targeted by environmental groups (specifically Singapore and Bangkok) displayed a heightened sensitivity to information gathering activities.

Key differences in some markets were, however, identified. In Malaysia, there appeared to be a growing acceptance of real and artificial shark fin mixtures, perhaps fuelled by a desire to reduce spending while the economy is poor. This factor may also explain why dried shark fin products did not appear to be prominent items in Chinese shops in urban areas since the mixtures would most likely be sold in restaurants. Singapore traders demonstrated the highest awareness of CITES and shark management issues. As a result, participation in trade association lobbying or individual efforts to keep abreast of the latest developments was common. Individual attitudes ranged from a sophisticated appreciation of the need to engage in the international debate to an overall sense of frustration at what they considered misrepresentation of their trade. The market in Thailand was the most difficult to characterize. From available information, it appears that the shark fin business in Bangkok is more heavily orientated toward the tourist market than in Singapore or Malaysia. The variety of high grade fins commonly available in small retail shops in Bangkok, and observed business linkages with Hong Kong, suggest that the market in Thailand may be more closely tied to China than other ASEAN countries.

7 CONCLUSIONS AND RECOMMENDATIONS

Sharks are arguably used for a wider variety of products than any other fish. The demand for shark products determines the degree to which sharks are targeted and utilized by fisheries, but extreme differences in market value among products worldwide have led to concerns regarding full utilization of these valuable resources. Expansion of markets for shark products, especially shark fin, have also sparked concerns about the sustainability of shark fisheries. Since

Southeast Asian countries host some of the world's largest shark fisheries and key shark fin trading centers, complementary studies of shark fisheries and trade have been undertaken in the region to support further development of shark fisheries management. A brief review of global trade in shark cartilage, skin, liver oil and teeth indicated that these markets appear to fluctuate over time but are not well documented in existing trade statistics. Shark fins and meat, two of the most commonly-traded and valuable shark products, were thus the focus of this study centered on the markets of Malaysia, Singapore and Thailand.

The study began by investigating shark production in the three countries to determine the role of domestic resources in supplying the market. Despite substantial reported elasmobranch (shark, skate and ray) landings in Thailand and Malaysia, available data for production of shark products in these countries indicates low quantities. This may be the result of statistical systems which do not differentiate shark products from other seafood and/or do not count unprocessed shark products such as fresh or frozen meat as production. Although under-reporting of fish commodity production is common in many countries, improved reporting of shark commodity production figures by ASEAN countries, possibly through linking shark landings monitoring and commodity production statistical systems, is recommended.

Regardless of the actual levels of domestic production in Malaysia, Singapore and Thailand, all three countries need to import shark meat and fins to satisfy domestic demand and/or entrepôt trade requirements. Of the three, Singapore is the largest importer of shark meat (1,000 to 2,000 mt per annum). Singapore's primary suppliers for shark meat are the British Indian Ocean Territory, Thailand, Taiwan and Japan. Malaysia and Thailand report lower levels of shark meat imports at 10 to 70 mt, and 110 to 320 mt, per annum, respectively. Singapore is also the largest importer of shark fins (600 to 1,500 mt per annum), in this case from the British Indian Ocean Territory, Hong Kong, Spain, India, Taiwan, Costa Rica, Yemen and Indonesia. Malaysia's shark fin imports are the lowest of the three, totaling 50 to 125 mt per annum, mainly from Indonesia and Singapore. Thailand's shark imports are slightly higher (100 to 200 mt per annum) and derive primarily from Hong Kong, and more recently, Mainland China.

This study also examined the role of each of the three countries as trading centers for shark products. The fresh and frozen shark meat trade in Malaysia, Singapore and Thailand comprises nearly all of the reported ASEAN imports. However, when compared to global totals, ASEAN's fresh and frozen shark meat trade figures are consistently less than 10%. In contrast, Singapore appears to be a major shark fin trading center controlling 10% of global imports and up to a quarter of world exports, at least through 1996 after which shark fin trade figures were no longer reported to FAO. Malaysia and Thailand have continuously submitted shark fin trade figures to FAO but their trade quantities are low. Given the importance of Singapore as a shark fin entrepôt, it is recommended that Singapore's shark fin trade figures be included in FAO statistics in order to facilitate accurate global shark fin trade monitoring. The continuing absence of these figures causes the FAO database to substantially under-estimate the ASEAN contribution to both imports and exports of shark fins, and to misrepresent the true scale of the shark fin trade.

Since the FAO database lacks data for Singapore, double counts transshipped imports, and does not distinguish between dried and frozen shark fins, it will not necessarily provide a reliable estimate of the quantity of shark fins in trade. Therefore, an alternative estimate was prepared using customs data from the three countries of interest and Hong Kong, Mainland China, Taiwan and Japan. Despite adjustments and corrections, the results are still believed to underestimate the total volume of shark fins marketed worldwide, primarily due to under-reporting in trade databases and because domestic consumption within countries that both produce and consume shark fins could not be included. Nevertheless, the global trade was estimated at 7,155 to 10,771 mt per annum between 1997 and 2002, considerably lower than the average for 1997-2001 of 14,138 mt per annum from the FAO database. The adjusted estimate for 2002 (8,536 mt) was the lowest figure since 1997, but showed Singapore handling 12% of

the global trade. In previous years, Singapore's share ranged from 7 to 17%, but neither Malaysia's nor Thailand's share ever exceeded 2%.

The analysis next turned to consumption of shark products and endeavored to estimate consumption by calculating the difference between imports and exports. Due to methodological complications presented by domestic production in Malaysia and Thailand, estimates were generated for Singapore only. No consistent trend of consumption versus export was observed in Singapore in terms of shark meat, but shark fin trade statistics and other sources suggested that between 100 and 500 mt of shark fin are consumed in Singapore each year, equating to 3 to 21% of the global trade total.

Export markets for the three countries of interest were also characterized. Singapore was found to be a consolidation hub for shark products from Southeast Asia before onward shipment to markets primarily located in East Asia. In addition to relying on Singapore as a transshipment center, Malaysia and Thailand also export shark products directly to Hong Kong and Mainland China. These trade channels are likely to expand as the demand for shark products in China grows and trade networks proliferate.

Price data for three types of shark fin offered for sale to Singapore by South Pacific dealers were compiled to examine market trends. Major effects on the shark fin trade, as indicated by price reductions, were observed with the onset of the Asian financial crisis in early 1998, the global economic downturn beginning in early 2001, and the SARS outbreak in April 2003. These data suggest that the market is demand-driven since changes in price appear to be closely tuned to factors likely to affect consumers' propensity to spend on luxury items such as shark fin.

Field surveys of shark fin markets in Malaysia, Thailand and Singapore allowed compilation of retail prices for a variety of shark fin products. Prices as high as 400 USD per kg for dried whole shark fin were commonly observed, with the most expensive of such products believed to be selling for 1,000 USD per kg. The lowest grade of shark fin consisted of loose, wet fin needle products in which the shark fin content could not be verified in advance of purchase and/or was subject to mixing with artificial shark fin. Such products retailed for under 10 USD per serving. Some information was gathered on the species used in the shark fin trade, but the practicality of such studies was limited by the apparent absence of standardized terminology for fins in these markets and the tendency to classify fins by needle quality rather than according to shark taxonomy.

The field surveys also provided insights into traders' attitudes and outlooks. In spite of the highly individual nature of each business, traders were generally in agreement on the importance of a healthy economy to their trade, the growing influence of Mainland Chinese consumers and overseas operatives on the market, and the full utilization of shark fins and meat in source fisheries. Differing views on CITES and the future of shark fisheries management were expressed, and individual traders adopted more or less proactive approaches to participating in debates that will shape these issues in the future. To the extent that this study opened a channel of communication with the trade community on these topics, it represents an important step forward for all parties.

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