

# Proposed Legislative Amendment in Hong Kong: Should Live Fish Be Regarded As Food?

by Thierry T.C. Chan

 思匯  
CIVIC EXCHANGE  
[www.civic-exchange.org](http://www.civic-exchange.org)

September 2006



**Proposed Legislative Amendment in Hong Kong:  
Should Live Fish Be Regarded As Food?**

**by**

**Thierry Tak-chuen Chan**

**September 2006**

**[www.civic-exchange.org](http://www.civic-exchange.org)**

Civic Exchange  
Room 701, Hoseinee House,  
69 Wyndham Street, Central, Hong Kong.

Tel: (852) 2893-0213    Fax: (852) 3105-9713

Civic Exchange is a non-profit organisation that helps to improve policy  
and decision-making through research and analysis.

<b><u>TABLE OF CONTENTS</u></b>	<i>page</i>
<b>RECOMMENDATIONS</b>	<b>1</b>
<b>SECTION 1 OVERVIEW</b>	<b>2</b>
1.1 Background	2
1.2 Import of live food fish	6
1.3 Government framework	9
1.4 Legco documents	11
1.5 Existing ordinances	15
1.6 Ciguatera	17
<b>SECTION 2 QUESTIONNAIRE SURVEY</b>	<b>26</b>
2.1 Inception	26
2.2 Survey	27
2.3 Results	28
2.4 Evaluation of the questionnaire survey	29
<b>SECTION 3 DISCUSSION</b>	<b>30</b>
<b>ACKNOWLEDGEMENTS</b>	<b>32</b>
<b>REFERENCES</b>	<b>33</b>
<b>TABLES</b>	
<b>APPENDICES</b>	

*Disclaimer:*

The views expressed in this report are those of the author and do not necessarily represent the opinions of Civic Exchange.

**LIST OF APPENDICES**

**APPENDIX I**

Questionnaire (English version)

**APPENDIX II**

Questionnaire (Chinese version)

**LIST OF TABLES**

**TABLE 1**

Estimated quantity (in metric tonnes) and monetary value (in HK\$ million) of live freshwater and marine fish imported into Hong Kong from 2000 to 2005

**TABLE 2**

Estimated quantity (in metric tonnes) and monetary value (in HK\$ million) of different kinds of live freshwater fish imported into Hong Kong from 2000 to 2005

**TABLE 3**

Estimated quantity (in metric tonnes) and monetary value (in HK\$ million) of different kinds of live marine fish imported into Hong Kong from 2000 to 2005

**TABLE 4**

Number of ciguatera fish poisoning cases and people affected in Hong Kong from 2000 to 2006 (till 30<sup>th</sup> May 2006)

## LIST OF ACRONYMS

AEHCD	Agriculture, Environment Hygiene and Conservation Department
AFCD	Agriculture, Fisheries and Conservation Department
AQIS	Australian Quarantine and Inspection Service
CFIA	Canadian Food Inspection Agency
CFP	Ciguatera Fish Poisoning
CFS	Centre for Food Safety
COP	Code of Practice
CSD	Census and Statistics Department
DAEH	Department of Agriculture and Environmental Hygiene
DFSIQ	Department of Food Safety, Inspection and Quarantine
DH	Department of Health
<i>E. coli</i>	<i>Escherichia coli</i>
EPD	Environmental Protection Department
FAO	Food and Agriculture Organization
FDA	Food and Drug Administration, US
FEHD	Food and Environmental Hygiene Department
FMO	Fish Marketing Organisation
FSEH Panel	Panel on Food Safety and Environmental Hygiene
FSIQD	Food Safety, Inspection and Quarantine Department
Government, the	Hong Kong Special Administrative Region Government
GDP	Gross Domestic Product
HACCP	Hazard Analysis Critical Control Point
HKPC	Hong Kong Productivity Council
QSAS	Quality Seawater Assurance Scheme
SPC	Secretariat of the Pacific Community
<i>Vibrio</i>	<i>Vibrio cholerae</i>

### RECOMMENDATIONS

**These recommendations represent conclusions drawn from the report that follows, and are intended to guide Government authorities and other interested parties in the proposed legislative amendment on live fish. The terminology and concepts included in these recommendations are explained and discussed in more detail in the body of the report.**

- 1. Legislative amendment.** The Hong Kong Special Administrative Region Government (the Government) needs to review and amend the existing regulatory mechanism on imported aquatic products (particularly the significant volumes of live food fish) so that live fish is properly regarded as ‘food’ for human consumption, thereby ensuring food safety in live fish consumption for the people of Hong Kong. Based on a preliminary questionnaire survey, respondents agreed on the need to treat live fish as ‘food’ which would require the corresponding legislative amendment gazetted and enacted as soon as possible.
- 2. Ciguatera fish poisoning.** Ciguatera fish poisoning is a threat not only to the health of the general public but also to the local seafood related industry and tourism. As for the case of malachite green, the Government needs to take effective action to prevent the public from being exposed to ciguatoxins from imported live reef food fish. A delay of more than 15 years in tackling this issue (compared with only 10 days for Malachite Green) has unnecessarily, even negligently, exposed many people to the risk of ciguatera.
- 3. Centralized live seafood market.** In parallel with regulating the import of aquatic products (including live food fish) through legislation in terms of food safety issues (e.g. outbreaks of ciguatera, shellfish poisoning, cholera, etc), the Government should set up a centralized market for all live seafood commodities so that food testing, origin tracing and the quarantine of all imported aquatic products (live) can be conducted in one place. A centralized market can also be developed as an attractive spot for the local tourism industry.

In order to ensure public health in marine fish consumption, live fish (both freshwater and marine) should be considered a food item with the proposed legislative amendment progressed as soon as possible. Regarding ciguatera fish poisoning (CFP), the Government could take the malachite green case<sup>1</sup> as a reference to prevent ciguatoxin-containing fish being sold for human consumption. Policy-makers need to give the live food fish trade, and associated problematic issues, appropriate attention in its role as an important food policy area directly affecting the health of the general public in Hong Kong. Measures must also address both direct and indirect negative economic consequences of CFP events.

---

<sup>1</sup> Refer to Background section for description of the incident.

## SECTION 1 OVERVIEW

### 1.1 BACKGROUND

#### *Public concern*

Recent incidents of the presence of malachite green in live food fish have again raised public awareness of the issue of food safety in relation to food supply and quality. On 16<sup>th</sup> August 2005, the State General Administration of Quality Supervision, Inspection and Quarantine of China reported the presence of malachite green in Guangdong eel products destined for export<sup>2</sup>. Just 10 days later, on 26<sup>th</sup> August 2005, the Government gazetted and enacted the Cap 132AF Harmful Substances in Food Regulations to prohibit the presence of malachite green in all food (including live fish) sold in Hong Kong<sup>3</sup>. Although the proposed legislative amendment will lessen the chance that the general public is exposed to food (especially live fish) containing malachite green, considerably more needs to be done, in general, regarding food safety for aquatic products to reduce continuing risks to the public from ciguatera and cholera. In particular, the associated legislation regarding seafood safety needs to be amended because in its current form it is not in the best interest of public health, is inconsistent and confusing (see footnote 2 for example). Significantly, it does not conform to most international standards.

In previous reports by Civic Exchange on marine policy<sup>4</sup> and on the status and sustainability considerations of aquaculture industry<sup>5</sup>, we recommended that the Government classify live fish as “food” under health regulations to give itself greater monitoring power with those intending to import live fish requiring the permission of the authority.

#### *Cases of food poisoning by live food fish consumption*

##### *Ciguatera fish poisoning (CFP)*

There have been 183 CFP cases, affecting 604 people, between 2000 and

---

<sup>2</sup> See <http://www.info.gov.hk/gia/general/200508/17/08170214.htm>.

<sup>3</sup> Under the existing laws (s 2 of Cap 132), “food” does not include live animals, live birds or live fish (excluding shell fish), while “animal” includes reptiles, but does not include birds or fish; and “fish” does not include live fish other than shell fish (reg 2 of Cap 132AF). In other words, live fish is not considered to be food except those containing malachite green (see Section 1.4 for details).

<sup>4</sup> Willmott, E. (2000) A Comprehensive Review of Marine Policy in Hong Kong. Civic Exchange, Hong Kong. 28pp. (<http://www.civic-exchange.org/publications/2000/marinepolicy.pdf>)

<sup>5</sup> Chan, T.T.C. (2005) Study on the Current Status and Potential Sustainable Development of The Aquaculture Industry in Hong Kong. Civic Exchange, Hong Kong. 64pp. (<http://www.civic-exchange.org/publications/2005/Aquaculture%20-%20E.pdf>)

2005<sup>6</sup>, in which more than half (involving 369 people) occurred in 2004 and 2005 (Table 4), although cases have been reported since 1989<sup>7</sup>. According to the Department of Health (DH)<sup>8</sup>, the earliest food poisoning case caused by ciguatera was in June 1989, with 3 people affected. However, in the absence of a good serologic and clinical test of CFP, it is believed that the number of cases is very likely to be under-reported or unreported in certain incidents (Wong et al, 2005). During 2006, up until 30th May 2006, there were 11 ciguatera cases with 36 people affected. It was also found from 1989-2005 statistics in Hong Kong that the number of people affected increased significantly with the number of CFP incidents (Yeung, 2006).

Although there has been no record of mortalities due to CFP, its incidence<sup>9</sup> and morbidity rate<sup>10</sup> are notably high and have negative health and economic implications. Outbreaks of CFP often raise much public attention with consequent negative impacts on the local seafood market and tourism (Wong et al, 2005). As one example, retail prices of all fish (both marine and freshwater fishes) in the seafood market declined 15-20% following several outbreaks in 1999 (Chan, 2000b).

In order to raise public awareness on CFP, the FEHD has issued posters and pamphlets<sup>11</sup> but the deliverables are rarely placed in restaurants or retail outlets (Sadovy and Mantel, 2006), or were displayed with the warning text removed (Sadovy, pers. obs.).

When compared with the rapid action (the necessary legislative amendment and enactment only took 10 days) to tackle the cases of malachite green, the slow Government response towards exposing the Hong Kong public to the risk of ciguatera seems indifferent at best, negligent at worst. Yeung (2006) suggested that the frequency of CFP cases in Hong Kong not only shows that the risks of CFP still exists in our society, but also reveals the inability of the Government in managing such a continuous, worldwide health problem.

---

<sup>6</sup> The relatively low number of cases in 2003 could be due to the outbreak of the SARS as people reduced the frequency of dining in the restaurants.

<sup>7</sup> CFP's symptoms include numbness of mouth and limbs, vomiting, diarrhoea, reversal of sensation of coldness and hotness, and pains of the joints and muscles.

<sup>8</sup> Email received from the Department of Health on 30th June and 11th July 2006.

<sup>9</sup> Incidence rates ranged from 0.05 to 1.79 per 100,000 population, with peaks at 1.79 in 1998 and 0.93 in 2004 (Yeung, 2006).

<sup>10</sup> Average morbidity rates of CFP and all food poisoning outbreaks caused by bacteria, chemicals, biochemicals, viruses, other known or unknown causative agents in 2000-2005 were 3.3 and 4.0 people / outbreak, respectively; the average morbidity rates of upper respiratory tract illness and influenza-like illness notified to the DH in 2000-2005 were 17.6 and 13.4 people / outbreak, respectively (source: Department of Health's online instant query module; <http://www.healthyhk.gov.hk/phisweb/enquiry/>).

<sup>11</sup> See <http://www.fehd.gov.hk/safefood/pamphlet.html#amm2>.

### *Cholera*

From 2000 to 2005, DH reported that there were a total of 71 cases of cholera in Hong Kong<sup>12</sup>. Among these, according to the Food and Environmental Hygiene Department<sup>13</sup> (FEHD), were twelve<sup>14</sup> recorded cases of cholera caused by high-risk infectious *Vibrio cholerae* (*Vibrio*) contamination of fish tank water from 2000 to June 2006. Although *Vibrio* is seldom found inside the seafood, contamination during food processing would result in infection.

In order to enhance the quality of fish tank water at source, and throughout the whole supply chain, to minimize the risk of contamination of seafood, the Health, Welfare and Food Bureau (HWFB) appointed the Hong Kong Productivity Council (HKPC) as the independent Accrediting Body to develop and implement a voluntary Quality Seawater Assurance Scheme<sup>15</sup> (QSAS) for seawater suppliers and seafood traders in Hong Kong with the purpose of encouraging self-regulation of the trade.

The QSAS was launched on 19<sup>th</sup> January 2006. The objective of the QSAS is to enhance the quality of supplied seawater and to help seafood traders to have better control of the quality of fish tank water for compliance with the prescribed legal standards. Under the QSAS, various stakeholders in the seafood trade can apply for two types of accreditation status, The Accredited Quality Seawater Supplier<sup>16</sup> and The Quality Seawater Logo Holder<sup>17</sup>. To increase public awareness of the QSAS, the HKPC has been using television commercial slots, certificate presentation ceremonies and has circulated promotional posters in offices of the Home Affairs Department, in municipal markets managed by the FEHD in and some supermarkets since 27<sup>th</sup> June 2006<sup>18</sup>.

### *Surveillance by the FEHD*

The role of FEHD, in respect of fish poisoning cases, is to carry out investigations with a view to stopping further distribution and also to address cases of suspected contaminated food and adopt necessary measures to prevent further outbreaks. It is notable, however, that the FEHD<sup>19</sup> have no records of confiscation of fish in connection with live fish poisoning cases despite the large numbers of cases of ciguatera that have

---

<sup>12</sup> Cholera's symptoms include painless profuse diarrhoea, vomiting, sharp leg pains.

<sup>13</sup> Email received from the FEHD on 22<sup>nd</sup> June 2006.

<sup>14</sup> 4 cases in 2001, 2 cases in 2003, 5 cases in 2004 and 1 case in 2006.

<sup>15</sup> See <http://www.hkpc.org/qsas/eng/index.htm>.

<sup>16</sup> As of 4<sup>th</sup> July 2006, there were two Accredited Quality Seawater Suppliers in Aberdeen and Cheung Sha Wan Fish Wholesale Markets.

<sup>17</sup> As of 4<sup>th</sup> July 2006, there were 111 Quality Seawater Logo Holders; updated lists can be found at [http://www.hkpc.org/qsas/eng/ld\\_a.htm](http://www.hkpc.org/qsas/eng/ld_a.htm).

<sup>18</sup> Phone conversation with Mr. David C.T. Chan of the Hong Kong Productivity Council on 4<sup>th</sup> July 2006.

<sup>19</sup> Emails received from the FEHD on 25<sup>th</sup> May and 9<sup>th</sup> August 2006.

been officially recorded in the last decade.

### *Economic loss*

Although there are no official data on the economic losses due to live food fish contamination / poisoning incidents, one fish wholesaler in Aberdeen destroyed 1600 kg (estimated value of HK\$ 560,000<sup>20</sup>) of live fish on 23rd August 2004 because of *Vibrio* contamination in fish tank water. Moreover, fish retail prices are known to decline for a period following publicised incidents of ciguatera (see Section 1.1). Yeung (2006) also suggested that CFP will lead to an economic loss of working days or hospital stays, inducing significant costs for business (including tourism-related industries) and the public.

### *Existing food-tests on fish*

The FEHD conducts a monitoring programme on fish tank water quality by regular sampling of fish tank water from each retail shop/market stall selling live marine seafood for detection of both infectious *Escherichia coli* (*E.coli*) and *Vibrio*.

Toxicity and potential presence of ciguatoxins in fish flesh can be studied through analysing lipid-soluble extracts using mouse bioassay and Cigua-Check®<sup>21</sup> (Wong et al, 2005). The Department of Zoology of the University of Hong Kong conducted regular screening tests for toxins in food and drinks for the Hygiene Division of the DH, although the current status of this programme could not be confirmed with the relevant parties. The mouse toxicity test is supplemented by general toxicology, and biochemical analysis (including for ciguatoxins, paralytic shellfish poison, neurotoxic shellfish poison, diarrhetic shellfish poison, etc.). In addition, they are also finding out the source of marine toxins in local seafood to locate the source of imported ciguatera-contaminated fish<sup>22</sup>.

### *Profile of live food fish trade in Hong Kong*

As of December 2005, there were around 1,440 retail shops/market stalls selling live fish under the management of the FEHD. However, the FEHD has no record of the number of live fish wholesalers in Hong Kong as the control of wholesale of fish is not within their jurisdiction<sup>23</sup>. So whose jurisdiction is it? According to the Agriculture, Fisheries and Conservation Department (AFCD)<sup>24</sup>, there are a total of 40 live fish stalls, which possess FEHD permits on water quality, distributed in three Fish

---

<sup>20</sup> Estimation was based on the wholesale price of leopard coral trout at HK\$ 350 per kg.

<sup>21</sup> See <http://cigua.oceanit.com/> for details.

<sup>22</sup> See <http://www.hku.hk/zoology/research/researchfood13.html>.

<sup>23</sup> Email received from the FEHD on 30th May 2006.

<sup>24</sup> Email received from the AFCD through 1823 Citizen's Easy Link on 8th July 2006.

Marketing Organization (FMO) markets<sup>25</sup>. Information on other live fish stalls outside FMO markets is not available.

### 1.2 IMPORT OF LIVE FOOD FISH

It is estimated that Hong Kong imports and consumes 65,000 to 82,000 metric tonnes of live food fish, including 35,000 to 47,000 metric tonnes of live freshwater fish<sup>26</sup> and 30,000 to 35,000 metric tonnes of live marine fish<sup>27</sup>, from different parts of the world every year. Fish are imported by air, sea and road, depending on the species and origin of the fish.

Import figures (by weight and value) on live food fish are collected by the Census and Statistics Department (C&SD) through Trade Declaration forms submitted by importers.

Live marine food fish (typically also known as live reef food fish) are imported by both sea and air. While C&SD data provide information on air imports and on fish arriving on non-Hong Kong licensed vessels, those vessels which are registered fishing vessels are not required to declare their catches as imports and are therefore not registered by C&SD. This is important since a large proportion of live seafood is imported by locally licensed vessels. As a result of this loophole, the AFCD estimates imports on locally licensed vessels by collecting information provided voluntarily by ten major fish traders transporting/collecting/fishing live marine fish into Hong Kong. It is estimated by the AFCD<sup>28</sup> that the import volume of these traders constitute about 50% of the total volume of live marine fish imported into Hong Kong by all fishing vessels.

#### *Freshwater fish*

In 2005, a total of 29,274 metric tonnes (valued at HK\$ 295 million) of freshwater fish were imported into Hong Kong (Table 1). When compared with the highest import of 47,655 metric tonnes (valued at HK\$ 522 million) in 2002, the annual import quantity and monetary value had decreased by 38.6% and 43.5% in 3 years, respectively. Among all imported live fish from 2000 to 2005, freshwater fish only comprised 23% to 32% of the total value, despite representing 65% to 78%, respectively, of the total annual weight.

In the past six years, grass carp comprised the majority (ranging from

---

<sup>25</sup> As of 8<sup>th</sup> July 2006, there were 26 stalls in Aberdeen, 4 stalls in Cheung Sha Wan and 10 stalls in Kwun Tong.

<sup>26</sup> See Trade Statistics from the Census and Statistics Department.

<sup>27</sup> See Chan (2000a).

<sup>28</sup> Cited the AFCD's annual report on live marine fish trade (2000-2003).

14.6% to 33.8%) of freshwater fish imported, followed by big-head carp and eels (*Anguilla* spp.) (Table 2). The monetary value of grass carp and big-head were estimated at HK\$ 67 million and HK\$ 43 million, respectively, at 2005 wholesale levels, as calculated by the imported quantity multiplied by the corresponding wholesale price<sup>29</sup>.

For other freshwater fish, the average percentage of the total in 2000-2002 increased from 38.2% to 59.2% in 2003-2005. Such augmentation might imply the increasing importance of different kinds of freshwater fish in the previously carp-dominated market to cope with the increasing local demand for a wider variety of food fish in Hong Kong [e.g. [http://www.afcd.gov.hk/english/fisheries/fish\\_aqu/fish\\_aqu\\_techdev/fish\\_aqu\\_techdev.html](http://www.afcd.gov.hk/english/fisheries/fish_aqu/fish_aqu_techdev/fish_aqu_techdev.html)]

### *Marine fish*

Between 2000 to 2005, an estimated average of 15,100 metric tonnes (valued at HK\$ 1,155 million) of live marine food fish were imported into Hong Kong annually (Table 1). In 2005, the AFCD<sup>30</sup> estimated that a total of 123,770 tonnes of marine fish (live, chilled or frozen) were consumed in Hong Kong. That means live marine food fish represents 12.7% (by weight) of all fisheries products consumption in 2005. However, given the high unit value of live fish, the value of dead and live fish to Hong Kong is similar economically, highlighting the very high economic value of live fish to Hong Kong. . Estimated import quantities were about 16,000 metric tonnes annually over the past six years. This amount may substantially underestimate the true import volumes since not all fish traders provide information. For example, Chan (2000a) suggested there are about 30,000 to 35,000 metric tonnes (with a total wholesale value of HK\$ 3,800 million) of live reef food fish imported into Hong Kong every year, contributing 24-28% (by weight) of the local consumption<sup>31</sup> of all marine food fish and considerably more in terms of economic income.

From 2001 to 2005, the leopard coral trout was the most abundant species imported, followed by the green grouper<sup>32</sup> (Table 3). Based on the calculation of the imported quantity multiplied by the wholesale price<sup>33</sup>, the leopard coral trout and green grouper<sup>34</sup> were estimated to be worth about HK\$ 843 million and HK\$ 126 million at the wholesale level in 2005,

---

<sup>29</sup> Based on the AFCD average wholesale prices of China-imported grass carp (HK\$ 12.9 per kg) and big-head (HK\$ 13.6 per kg) in 2005.

<sup>30</sup> Personal communication with Mr. Rock K.Y. Kwok (Fisheries Officer, Email: [rock\\_ky\\_kwok@afcd.gov.hk](mailto:rock_ky_kwok@afcd.gov.hk); Tel: 28738341) of the AFCD on 31<sup>st</sup> August 2006.

<sup>31</sup> Assuming all imported live marine food fish was for local consumption.

<sup>32</sup> Excluding the categories of other groupers, other wrasses and parrotfish, and other marine fish.

<sup>33</sup> Based on the average wholesale prices posted by the Fish Marketing Organization on 15<sup>th</sup> June 2006 (<http://www.fmo.org.hk/page4eng.html>); accessed on 15<sup>th</sup> June 2006.

<sup>34</sup> Average wholesale price of the leopard coral trout and green grouper on 15<sup>th</sup> June 2006 were HK\$ 337 per kg and HK\$ 86 per kg, respectively (<http://www.fmo.org.hk/page4eng.html>).

respectively. Assuming the wholesaler sells the fish to retailers at 10% profit (Chan, 2000a), the import value at cost of these two species (which comprised 25.2% of all imported fish by number) will be HK\$ 872 million in 2005. According to the Hong Kong Trade Statistics of the C&SD, 99.5% and 97.4% of the leopard coral trout and green grouper were used for local consumption<sup>35</sup>, a substantial monetary value of over HK\$1.1 billion<sup>36</sup> would result from the sale of the imported leopard coral trout and green grouper<sup>37</sup> in local Chinese seafood restaurants in 2005 (IMAHK, 2003).

### *Country of origin*

Primary production in Hong Kong is less than 1% of its gross domestic product (GDP). Local live food fish (freshwater and marine) production only comprised 2.0% of the annual fisheries production in 2004 (Chan, 2005). In other words, almost all live food fishes are exotic which makes Hong Kong prone to risks brought in by uncontrolled imports of food.

### *Freshwater fish*

According to the Hong Kong Trade Statistics from the C&SD, live freshwater fish were imported into Hong Kong from 28 countries in 1997-2005, namely (in alphabetical order) Australia, Bangladesh, Benin, Bulgaria, Cambodia, Central and South American, China, France, Indonesia, India, Japan, Kampuchea, Korea, Malaysia, Myanmar, Namibia, New Zealand, Oceania, Philippines, Singapore, Solomon Islands, South Africa, Spain, Switzerland, Taiwan, Thailand, United States and Vietnam. However, in terms of quantity, more than 92% of all live freshwater fish<sup>38</sup> were imported annually from China in 2000-2005. This implies that control on the import of live freshwater fish can be achieved by improved monitoring on China-produced fish through collaboration with the mainland authorities.

### *Marine fish*

Australia, China, Indonesia, Philippines and Thailand are the major exporters of live marine fish, representing more than 90% of all live reef food fish annually, although many countries might be involved. Since 1997, live marine fish were consigned to Hong Kong from 41 exporting

---

<sup>35</sup> Local consumption is calculated from subtracting the re-export from the import quantity.

<sup>36</sup> Assuming 90% of all imported fish were consumed in local Chinese seafood restaurants, with the remaining 10% were sold in municipal markets..

<sup>37</sup> The mean retail prices of the leopard coral trout and green grouper in July 2003 were HK\$ 438.8 per kg and HK\$ 137.6 per kg, respectively (IMAHK, 2003).

<sup>38</sup> From 2000 to 2005, China imported more than 99% of grass carp and other carps, more than 98% of big-head, 100% of snooks and basses, and an average of 92.6% of other freshwater fish into Hong Kong. For eels, the percentage of China-share declined gradually from 59% (784,246 kg) in 2000 to 11.8% (196,887 kg) in 2005.

countries.<sup>39</sup> Excluding other marine fish (i.e. non coral reef fishes), an average of 9,471 metric tonnes of live reef food fish were imported annually from 2000 to 2005. Nevertheless, since only a small subset of countries pose a risk of ciguatoxins in reef food fish, the control on ciguatoxic fish is feasible in the presence of reliable test on ciguatoxin and/or control of country of export, combined with a health certification systems.

As suggested by the Government, it is much easier to control the import of live freshwater fish than marine fish because only registered fish farms approved by the relevant Mainland Authorities are allowed to export freshwater fish (accompanied with health certificate issued by the relevant Authorities) to Hong Kong<sup>40</sup>. For live marine fish, the practice of tracing back the country of origin is necessary and will require a centralised wholesale market (Chan, 2005).

### 1.3 GOVERNMENT FRAMEWORK

In order to lessen public concern arising after a series of food contamination incidents, in October 2005, the HWFB proposed three plans for the re-organization of relevant authorities with the aim of enhancing food safety, veterinary and public health control in Hong Kong. This section summarizes the details of the re-organization plans in chronological order and the consequences of the proposed re-organization.

#### *17<sup>th</sup> October 2005*

The HWFB proposed a re-organization of the FEHD and AFCD, which are jointly responsible for the same policy area of “Agriculture, Fisheries and Food Safety”, to form the Food Safety, Inspection and Quarantine Department (FSIQD) and the Agriculture, Environment Hygiene and Conservation Department (AEHCD). The FSIQD was to take up all functions concerning food safety, veterinary public health, inspection, quarantine and regulations over animals and plants (including fresh water fish for food purposes, seafood and food products). In addition, the HWFB proposed the establishment of a Centre for Food Safety (CFS) within FSIQD and the creation of a post of Controller in CFS to oversee

---

<sup>39</sup> In alphabetic order: Australia, Bangladesh, Brunei, Cambodia, Canada, Chad, Chile, China, Fiji, France, India, Indonesia, Japan, Kiribati, Korea, Malaysia, Maldives, Mali, Marshall Islands, Mexico, Morocco, Myanmar, Namibia, Nauru, New Zealand, Palau, Papua New Guinea, Pakistan, Philippines, Seychelles, Singapore, Solomon Islands, South Africa, Sri Lanka, Taiwan, Thailand, Togo, United Kingdom, US Oceania, United States, Vietnam and Virgin Islands.

<sup>40</sup> See <http://www.info.gov.hk/gia/general/200604/16/P200604160151.htm>.

the daily operation and management of the CFS, identify objectives and formulate strategies on food safety<sup>41</sup>.

### *25<sup>th</sup> November 2005*

The HWFB revised the proposal to integrate the nature conservation functions of the AFCD with the environmental protection functions of the Environmental Protection Department (EPD), with the support of the Secretary for the Environment, Transport and Works. The revised plan proposed reorganization of the FEHD and AFCD to form the Department of Food Safety, Inspection and Quarantine (DFSIQ) and the Department of Agriculture and Environmental Hygiene (DAEH). The new DFSIQ was to take up the FEHD's regulatory functions over food, live food animals and poultry, vegetables, fish/seafood, cooked food, food products and slaughterhouse management as well as AFCD's function in the inspection and quarantine of imported live animals and plants not intended for human consumption, licensing of livestock and mariculture farms, animal management and welfare, and regulation of pesticides. Similar to the previous plan, a CFS was to be established within the DFSIQ with a Controller post to be created<sup>42</sup>.

### *17<sup>th</sup> January 2006*

The HWFB announced that the CFS will be established, consisting of the Food Surveillance and Control Branch and the Risk Assessment and Communication Branch (now in the FEHD) initially within the FEHD, and that a CFS Controller post will be created within the FEHD. The Controller will be responsible for the overall management of the CFS, making day-to-day management, professional and operational decisions, identifying objectives and formulating strategies to implement food safety measures. The Controller will lead high-level negotiations and liaise with Mainland and overseas food authorities on food safety matters that have cross-border implications<sup>43</sup>. To strengthen the existing consultative framework, a Food Safety Committee (consisting of academics, professionals, food experts and trade representatives) within the CFS will be set up with responsibility for the formulation of food safety measures, and which will review of food safety standards in light of international practices, trends and developments.

### *2<sup>nd</sup> May, 2006*

Official establishment of the Controller of the CFS.

---

<sup>41</sup> See <http://legco.gov.hk/yr05-06/english/panels/fseh/papers/fe1017cb2-26-02-e.pdf> for more details.

<sup>42</sup> See <http://legco.gov.hk/yr05-06/english/panels/fseh/papers/feea1129cb2-464-0 1-e.pdf> for more details.

<sup>43</sup> Other duties of the Controller include overseeing management of the local slaughterhouses to ensure that procedures and meat hygiene meet required standards; planning and directing the implementation of policies on the control of pests of public health significance.

### *Consequences*

The Panel on Food Safety and Environmental Hygiene noted that while most stakeholders supported the proposed reorganisation of the food safety framework and the establishment of the CFS to strengthen food safety control, many staff associations in the affected departments expressed strong views against the proposed splitting up and reorganising the AFCD and FEHD, as well as the transferring of AFCD's nature conservation and country/marine park staff to the EPD<sup>44</sup>. As a result, the HWFB has indicated that it needs more time to engage with stakeholders in further discussions on the reorganization plan. In addition, the HWFB confirmed that the proposed establishment of the CFS will not involve the reorganization of the AFCD as previously proposed<sup>45</sup>. On 2<sup>nd</sup> May 2006, the official appointment of the Controller of the CFS marked the establishment of the CFS.

## 1.4 LEGCO DOCUMENTS

This section summarizes food safety of live food fish (both freshwater and marine) consumption discussions conducted by the Panel on Food Safety and Environmental Hygiene (the FSEH Panel) of the Legislative Council from 2000 to July 2006.

### *Regulating aquatic products*

#### *14<sup>th</sup> February 2006<sup>46</sup>*

According to the *Timetable for Introducing Legislative Proposals*, the HWFB is reviewing overseas regulatory frameworks and practices for aquatic products with a view to formulating the local regulatory regime, which includes:

- ◇ All traders in the fishery products business, including producers, transporters, sellers, etc. will need to be registered;
- ◇ Imports will have to land at designated landing points;
- ◇ Documentation will be required for imports, sale and purchase of fishery products with health certificate requirements for cultured products assigned, and
- ◇ Power needs to be established for the relevant authorities to inspect, test and recall fishery products on public health grounds.

Regulatory framework and practices for aquatic products was planned for the next legislative session from October 2006 to August 2007.

---

<sup>44</sup> See <http://www.legco.gov.hk/yr05-06/english/panels/fseh/reports/fe0705cb2-2628-e.pdf>.

<sup>45</sup> See <http://legco.gov.hk/yr05-06/english/panels/fseh/papers/feea0117cb2-863-01-e.pdf> for more details.

<sup>46</sup> See <http://www.legco.gov.hk/yr05-06/english/panels/fseh/papers/fe0214cb2-1069-06-e.pdf>.

*20<sup>th</sup> April 2006*<sup>47</sup>

During the discussion on the regulation of aquatic food products by the FSEH Panel, the HWFB indicated that they would find ways to safeguard the safety of aquatic food products and fishery products after the establishment of the CFS. In addition, they would also actively consider legislative amendments to further strengthen regulation on aquatic and fishery products, and, furthermore, that they aimed to submit their plan for a regulatory mechanism to the Legco and consult the trade at the end of 2006.

### *Prohibition of abstraction of seawater*

*15<sup>th</sup> April 2005*<sup>48</sup>

The HWFB proposed to prohibit abstraction of seawater, used for keeping live seafood, from specified areas (based on the level of *E. coli*), to enhance the quality of fish tank water.

*14<sup>th</sup> February 2006*<sup>49</sup>

Concerning the prohibition of abstraction of seawater from specified areas, Section 10A (Control of water quality) of Cap. 132X (Food Business Regulation) states that no person shall in the course of any food business keep any live fish or shell fish intended for human consumption in water of a quality below the legal standard, no matter where the water comes from. In order to implement better control of the source of water used for keeping live fish and shell fish<sup>50</sup> intended for human consumption, the HWFB proposed to prohibit the abstraction of seawater from specified areas along the coast with consistently unsatisfactory water quality.

This proposal on prohibiting seawater abstraction from specified areas will be introduced in the next legislative session from October 2006 to August 2007.

### *Control on the import of live freshwater fish from China*

*16<sup>th</sup> April 2006*<sup>51</sup>

According to the agreement reached with the Mainland, the HWFB announced that only registered fish farms approved by the relevant

---

<sup>47</sup> See <http://www.legco.gov.hk/yr05-06/english/panels/fseh/papers/fe0420cb2-1789-01-e.pdf>.

<sup>48</sup> See <http://www.legco.gov.hk/yr04-05/english/panels/fseh/papers/fe0415cb2-1230-03-e.pdf>.

<sup>49</sup> Ibid as footnote 46.

<sup>50</sup> According to Section 28 (Prohibition against the collection of shell fish in certain areas) of Cap 132X, no person shall collect for sale for human consumption any shell fish in the harbour or the harbour in Aberdeen.

<sup>51</sup> See <http://www.info.gov.hk/gia/general/200604/16/P200604160151.htm>.

Mainland Authorities were allowed to export freshwater fish to Hong Kong. Each consignment was required to be accompanied by a health certificate issued by the relevant Authorities to testify that the fish are free of malachite green and other harmful substances.

The HWFB pointed out that if the importers of freshwater fish are unable to produce the relevant documentary proof and health certificate when landing the fish at wholesale markets, the AFCD would refer the case to the FEHD. The FEHD will then hold the consignment for testing to ensure compliance with our public health requirements. If these products are found to contain malachite green, the consignment will be destroyed and the importers will be prosecuted. The details of the importers, including the vessels and farms exporting freshwater fish, will also be passed on to the mainland authorities for follow-up action.

### *Establishment of the Centre for Food Safety*

*2<sup>nd</sup> May 2006*<sup>52</sup>

The official appointment of the Controller of the CFS marked the establishment of the CFS. The CFS also declared that it will submit a draft proposal on the control of the imports of live fish to the Legco in August / September 2006<sup>53</sup>.

### *Problem of ciguatera fish poisoning (CFP)*

*13<sup>th</sup> July 2004*<sup>54</sup>

The HWFB proposed a two-phased approach to address the problem of CFP at an early stage. As the HWFB claimed that it will take a long time to enact legislation to regulate live fish, a voluntary Code of Practice (COP) was developed during the first phase. The COP required the fish traders to provide information on each lot of collected / imported fish. For the second phase, the HWFB will review its effectiveness one year after implementation and consider the suitability, or otherwise, of extending this pilot scheme to regulate other kinds of seafood. If the HWFB finds this scheme is ineffective, the HWFB will consider other measures, including the introduction of legislation, to further strengthen the control on live food fish..

---

<sup>52</sup> See <http://www.info.gov.hk/gia/general/200605/02/P200605020130.htm>.

<sup>53</sup> According to a news broadcast on RTHK 2 on 2<sup>nd</sup> May 2006.

<sup>54</sup> See <http://www.legco.gov.hk/yr03-04/english/panels/fseh/papers/fe0713cb2-3051-01-e.pdf>.

*26<sup>th</sup> October 2004<sup>55</sup>*

The FSEH Panel discussed the monitoring and control system and preventive measures to address the problem of CFP. It was indicated that the FEHD would conduct random sampling tests for ciguatoxins and that concrete proposals through legislative reviews would be put forward to the FSEH Panel in 3 to 4 months regarding the extension of regulatory control to live fish. Besides, the adoption of a two-phased approach to address the problem of CFP at an early stage and a voluntary COP (in which the fish traders were requested to voluntarily provide information on each lot of fish catch) would improve the regulatory control in parallel with the review of existing legislation.

*December 2004<sup>56</sup>*

To prevent and control CFP, the FEHD developed a voluntary COP on the Import and Sale of Live Marine Fish for Human Consumption in consultation with the trade which was put in place in December 2004. Under the code, traders are required to avoid the import and sale of high risk fish, keep transaction records of all live marine fish for at least 60 days, and report to the FEHD every import of live coral fish within 48 hours of arrival<sup>57</sup>. The COP contains the minimum requirements for importing and selling live marine food fish and is applicable to all importers, wholesalers and retailers. Importers are recommended not to import fish known to have a high chance of carrying ciguatoxin, or coral reef fish from unknown or suspicious sources. For wholesalers and retailers, they are advised not to purchase and sell these types of fish. The FEHD will regularly update and disseminate to the trade a list of fish that is considered to be of higher risk for CFP. The trade is recommended to keep proper and accurate records of the supplies and distribution of all live marine fish with details on the source of fish, landing point, distribution, amount, fish types, and addresses and names of purchasers and distributors for at least 60 days counting from the date of each transaction. These records will be inspected regularly by officers of the Government.

Upon receipt of notifications of CFP from the DH, the FEHD will inform the traders involved to stop the sale and distribution of the ciguatoxic fish immediately. The COP will be reviewed regularly in consultation with the fish trade and other government departments.

---

<sup>55</sup> See <http://www.legco.gov.hk/yr04-05/english/panels/fseh/papers/fe1026cb2-75-07-e.pdf>.

<sup>56</sup> See [http://www.fehd.gov.hk/safefood/library/Ciguatera\\_fish/fish\\_cop\\_e.pdf](http://www.fehd.gov.hk/safefood/library/Ciguatera_fish/fish_cop_e.pdf).

<sup>57</sup> See <http://www.fehd.gov.hk/publications/annualrpt/2005/2.html>.

*10<sup>th</sup> October 2005*<sup>58</sup>

Preliminary assessment on the effectiveness of the COP in July 2005 indicated problems with voluntary compliance. According to the Secretary of Health, Welfare and Food, owing to the number of reported on shipment of live fish was not satisfactory, the Government proposed a consultation with fish trading and catering industry, and the introduction of a mandatory system. The FEHD will explore the feasibility of further measures, e.g. requiring importers of coral fish to obtain import permits before landing the fish in Hong Kong and establishing designated landing points, etc., to facilitate collection of information on distribution and sale of live marine fish

### 1.5 EXISTING ORDINANCES AND REGULATIONS

This section summarizes existing laws and regulations related to live food fish trade in Hong Kong.

#### Cap. 132 Public Health and Municipal Services Ordinance

Under Section 2 (Interpretation), although “animal” does not include “fish<sup>59</sup>” and “food” does not include “live fish”, live fish can be deemed as food “*for the prohibition, restriction or regulation of the sale, or possession, offer or exposure for sale or consignment or delivery for sale in the interests of public health or for the protection of the public*” (Section 57). Neither FEHD nor AFCD could explain the reason for these classifications so it is not clear what the justification is for treating live fish so inconsistently and differently from other food items.

On discovery of *Vibrio* in a water sample collected from fish tank, the FEHD can order the temporary closure of the stall / premises<sup>60</sup> until the Director of the FEHD is satisfied with the overall hygiene condition of the premises and that there is no immediate health hazard.

Although there have been hundreds of victims of ciguatera over the past 10 years fish have been imported with malachite green, the FEHD has no record of confiscation of fish in connection with food poisoning cases in the past<sup>61</sup>. In some cases of CFP, the fish traders voluntarily surrendered and disposed of the suspected ciguatoxin-containing fish. For cases of

---

<sup>58</sup> See <http://www.legco.gov.hk/yr04-05/english/panels/fseh/minutes/fs050712.pdf> and <http://www.legco.gov.hk/yr05-06/english/panels/fseh/papers/fe1013cb2-3-app-v-e.pdf>.

<sup>59</sup> According to Cap 132, “fish” means “all fish commonly used for human consumption and also means any other fish which is sold or offered for sale for human consumption”.

<sup>60</sup> According to the FEHD (email received on 4<sup>th</sup> September 2006), there are 9 cases of temporary closure of stall / premises subsequent to the detection of *Vibrio* in fish tank water.

<sup>61</sup> Ibid as footnote 19.

malachite green contamination, exporters stopped supplying the suspected fish species voluntarily or compulsorily by the China authority.

### Cap. 132AF Harmful Substances in Food Regulations

Under Schedule 1 (maximum concentration of certain substances present in specified foods), the maximum concentration of malachite green in any food (including live fish, live reptiles and live poultry) is 0 microgram per kilogram of the food. This is the only regulatory statement considering live fish as food<sup>62</sup> although the Interpretation of Cap. 132AF says *fish does not include live fish other than shell fish*.

### Cap 132X Food Business Regulation

Section 10A (Control of water quality) provides that *no person shall in the course of any food business keep any live fish or shell fish intended for human consumption in water of a quality below the standard<sup>63</sup> specified by the Director of Food and Environmental Hygiene by notice published in the Gazette*.

FEHD takes samples of fish tank water from each stall / premises (including supermarkets) selling live marine seafood for *E. coli* testing once every eight weeks. When the samples are found to exceed the prescribed standard, the FEHD will conduct an investigation to find out the source of contamination and collect follow-up samples for further testing. Regarding *Vibrio* in fish tank water, the FEHD also takes samples for analysis during the high-risk season from May to September. Once the presence of *Vibrio* is detected, the premises concerned may be closed by the FEHD under the authority conferred by section 128C of the Public Health and Municipal Services Ordinance (Cap. 132).

To better control the water source for keeping live fish and shell fish intended for human consumption, the HWFB proposed to amend Cap. 132X to prohibit abstraction of seawater from specified areas along the coast with consistently unsatisfactory water quality in the next legislative session<sup>64</sup>.

### Cap. 139 Public Health (Animals & Birds) Ordinance

Live fish are not subject to this Ordinance which defines “animal” as cattle, sheep, goats, all other ruminating animals, swine, equines, and all other warm-blooded vertebrates except man, birds, and reptiles under Section 2 (Interpretation).

---

<sup>62</sup> Live fish is not regarded as food in Hong Kong except those containing malachite green (see footnote 3).

<sup>63</sup> The specified standard is “*E. coli* less than 610 per 100 ml and absence of pathogenic organisms”.

<sup>64</sup> See <http://www.legco.gov.hk/yr05-06/english/panels/fseh/papers/fe0214cb2-1069-06-e.pdf>.

The Government has no laws requiring imported live fish to be quarantined despite the large volume of fish entering Hong Kong from different countries via different forms of transportation, and despite the risk to the public. Although it was suggested that a quarantine service may be cost-inefficient and beyond the financial means of the industry (Wong, 1995), from the food safety point of view, a centralized hub for loading fish is essential for tracing the countries of origin of live fish (especially for live reef food fish) in cases of occasional ciguatera or *Vibrio* outbreaks. Such a hub would also facilitate the quarantine of imported fish and facilitate spot-checking for food safety.

### Cap. 291 Marine Fish (Marketing) Ordinance

According Section 3, no dead marine food fish “*may be landed other than at places specified by regulations and no marine fish may be sold, offered or exposed for sale or possessed for the purpose of sale, by wholesale, otherwise than at a wholesale marine fish market conducted by the FMO or otherwise than by way of re-sale following a sale at a market*”. However, fishermen can sell live catches on their own, without going through the FMO because under Section 2 (Interpretation), “*marine fish*” means “*any fish or part thereof, whether fresh or processed, in any manner indigenous in sea water or partly in fresh water and partly in sea water, including any product derived therefrom, but excluding all crustaceans or mollusks and fish alive and in water*”. Moreover, this Ordinance does not control the import, export and sales of live marine fish. In addition, the confusing and inconsistent laws on seafood (particularly food fish) permits the existence of unfair trade between live and dead fish trades.

## 1.6 CIGUATERA

CFP is a food-borne disease caused by the presence of ciguatoxin(s) in the flesh and viscera of tropical and subtropical coral reef fishes. This toxin is produced by dinoflagellates that are usually attached to dead coral surfaces in the sea, especially in tropical areas. Fish eating this algae will become toxic and the effect is magnified by bioaccumulation through the food chain, especially for the top carnivorous species like many groupers and certain snappers and wrasses. The appearance, taste and smell of ciguatoxin-containing fish have no difference when compared with normal fish. Generally speaking, larger coral reef fish have higher levels of ciguatoxin, but this is by no means also true and quite small species, such as *Cephalopholis argus*, part of the live fish trade in Hong Kong, is often ciguatoxic (Halstead *et al*, 1990). For these reasons, recommendations regarding the consumption of smaller fishes or certain species to avoid the problem of ciguatera are only partly useful and, at times can be misleading.

Ciguatoxin is generally harmless to the fish but may cause gastrointestinal and neurological symptoms<sup>65</sup> in humans after consumption of contaminated fish. It was found that 0.1 µg<sup>66</sup> of ciguatoxin is enough to pose a significant health impact on humans (Pierce and Kirkpatrick, 2001). Although the majority of people affected undergo recovery, residual effects are frequent with subsequent exposures to toxic fishes more rapidly producing a negative response.

Ciguatera has been comprehensively documented as endemic in specific areas of the tropical and subtropical Pacific, tropical Indian Ocean and Caribbean Sea. Lewis (2000) estimated that CFP affects more than 25,000 persons annually, while fatalities are rare (about 0.1% of cases). Occurrences of CFP in Hong Kong are rather common and usually caused by imported coral reef fish from a few ciguatera-prone areas in the Pacific<sup>67</sup>. The stability of ciguatoxins to freezing, cooking and transportation further increase the risk of intoxication (Wong et al, 2005).

### *Current monitoring and control system*<sup>68</sup>

A voluntary reporting, tracing and retrieval system for coral reef fishes was established with fish traders in 1998. Under the system, fish importers report to FEHD (to the former Agriculture and Fisheries Department before 2000) on arrival of coral reef fish in Hong Kong and provide information on the source, type and size of the fish. Fish importers are also advised to maintain proper records of fish distribution to facilitate tracing and retrieval should there be incidents of CFP. Based on the findings by the HWFB, as the compliance with the voluntary reporting system by the trade was less than satisfactory (the numbers of shipment were under-reported), a mandatory system is being studied by the Government

In addition, staff of the Centre for Food Safety will collect samples of coral fishes from different sources including importers, wholesalers and retailers for the testing of ciguatoxin throughout the year. Samples are also taken during the course of investigation of CFP cases. Two to three hundred samples are taken each year for ciguatoxin testing. According to the FEHD<sup>69</sup>, over 2,100 samples were taken for ciguatera toxin testing in 2000-2005, of which 36 samples were considered to be unsatisfactory<sup>70</sup>,

---

<sup>65</sup> Symptoms include numbness of mouth and limbs, vomiting, diarrhoea, reversal of sensation of coldness and hotness, and pains of the joints and muscles.

<sup>66</sup> 1 µg = 0.000001 g.

<sup>67</sup> Including Great Barrier Reef of Australia, Kiribati, Marshall Islands, Solomon Islands and Tuvalu.

<sup>68</sup> See <http://www.legco.gov.hk/yr04-05/english/panels/fseh/papers/fe1026cb2-75-06-e.pdf>.

<sup>69</sup> Email received from the FEHD on 24th August 2006.

<sup>70</sup> Samples which are found to contain ciguatoxin at levels above 200 mouse-unit/kg will be considered to be unsatisfactory.

with samples containing ciguatoxin level of 210 to 380 mouse-unit/kg. In 2003, of the 361 samples taken only one (0.3%) was found to have an unsatisfactory result. Up to August 2004, of the 201 samples taken and with results available, four (2%) were found to have unsatisfactory result. Yeung (2006) stated that a total of 59 coral reef fish samples were randomly collected from markets by inspectorate staff of FEHD during surveillance for ciguatoxin contamination in 2004. There were 55 coral fish samples for testing the presence of ciguatoxins by DH using validated *in vivo* method, mouse bioassay. Wong et al (2005) indicated that it is often difficult to trace or identify the ciguatoxin-containing fish in the market because of its unpredictable occurrence and scarcity of the susceptible species. Owing to the difficulties of applying ciguatoxin detection methods in the restaurant or markets, validated mouse bioassay is conducted since this is still the most widely used and accepted laboratory test for the detection of ciguatoxins level in fish samples (Wong et al, 2005). According to the U.S. Food and Drug Administration of the Center for Food Safety and Applied Nutrition, ciguatoxins can be recovered from toxic fish through extraction and purification procedures. The mouse bioassay is a generally accepted method of establishing toxicity of suspect fish<sup>71</sup>.

In Hong Kong, a set of 4 or 5 criteria is used to determine cases of CFP: (1) definite recent history of coral reef fish consumption; (2) typical symptoms of CFP within twenty-four hours after fish intake; (3) compatible clinical data; and (4) laboratory detection of ciguatoxin in the food remnant from the victim; or (5) epidemiological correlation between food poisoning case and recent outbreak (Wong et al, 2005).

Incidents of CFP are often reported by the DH. Cases where the incriminated fish is consumed or purchased in Hong Kong will be referred to the FEHD for immediate action to investigate the fish species involved, trace the fish source at retail, wholesale and import levels, and advise the fish traders concerned to stop selling the same fish species belonging to the same shipment. Samples of fish will be taken for laboratory analysis where appropriate for closer surveillance. According to the FEHD<sup>72</sup>, no prosecutions have been taken out by Food Surveillance and Certification Section staff relating to ciguatoxic fishes since 2000, despite toxic fish being brought into Hong Kong on many occasions.

The FEHD also liaises with the Hong Kong Chamber of Seafood Merchants Limited to trace the country of origin, and advise fish traders and fishermen to be cautious in importing or selling the suspected fish species from the affected fishing ground.

---

<sup>71</sup> See <http://www.cfsan.fda.gov/~mow/chap36.html>.

<sup>72</sup> Email received from the FEHD on 13th September 2006.

To enhance the knowledge of the public on ciguatera fish poisoning, the FEHD also produced a series of publicity materials such as leaflets, posters and food safety bulletins for people of different spectrum, and disseminated these through a number of channels and activities such as the internet<sup>73</sup> and health talks. DH will also give health advice to the public after each ciguatera incident (Yeung, 2006).

According to the FEHD<sup>74</sup>, they are now promoting the Hazard Analysis Critical Control Point (HACCP) system to the general public and the food trade. In the past years, the FEHD had introduced this voluntary system to some selected high-risk<sup>75</sup> food manufacturing industry which included Sushi and sashimi operators, Lunch box suppliers, “siu mei” and lo mei suppliers, buffet providers, bakery manufacturers and “poon choi” suppliers. However, as live food fish is not regarded as high risk food, HACCP is not implemented for food fish trade. Every year, the FEHD examines the food trade for high-risk food and introduces the HACCP System for adoption in their production processes so as to enhance overall food safety standards. Workshops for these target food trades are conducted and visits to the premises will also be made before and after the workshops. Other promotion activities of the HACCP system include roving exhibitions, internet, 24-hour telephone hotline, publicity materials and food hygiene seminars, etc.

On enhancing the knowledge of the public on ciguatera fish poisoning, the FEHD also produced a series of publicity materials such as leaflets, posters and food safety bulletins for people of different spectrum, and disseminated through a number of channels and activities such as the internet and health talks. However, Yeung (2006) queried the effectiveness of publicity and public health education done by the authorities.

### *Susceptible species*

According to the Safe Food and Public Health Printed Materials produced by the FEHD<sup>76</sup>, there are 12 susceptible common coral reef fish containing

---

<sup>73</sup> See [http://www.fehd.gov.hk/safefood/food-safety-express/safety\\_channel/public\\_200504\\_text.html](http://www.fehd.gov.hk/safefood/food-safety-express/safety_channel/public_200504_text.html) and [http://www.fehd.gov.hk/safefood/poison\\_fish.html](http://www.fehd.gov.hk/safefood/poison_fish.html).

<sup>74</sup> Email received from the FEHD on 17<sup>th</sup> August 2006.

<sup>75</sup> According to the FEHD (email received on 29<sup>th</sup> August 2006), there is no legal definition for "high risk" in existing ordinance. Generally speaking, high risk food refers to food that may contain pathogenic microorganisms and will support formation of toxins or growth of pathogenic microorganisms. Examples are raw meat, fish, poultry, milk and ready-to-eat foods which can pose a particularly high chance of outbreak of food poisoning if they are not handled properly, processed or cooked adequately. High risk food requires temperature control to minimize the bacterial growth so as to prevent food poisoning outbreak. In addition, as malachite Green is a chemical and it has no direct relationship with the term "high risk". Any food which is intentionally added with malachite green is beyond the definition of high-risk food.

<sup>76</sup> See [http://www.fehd.gov.hk/safefood/library/Ciguatera\\_fish/1.html](http://www.fehd.gov.hk/safefood/library/Ciguatera_fish/1.html) and <http://www.fehd.gov.hk/safefood/library/fphposter/ciguatera.html>.

ciguatoxin entering Hong Kong, these include moral eel, humphead wrasse (*Cheilinus undulates*), high fin grouper (*Cromileptes altivelis*), speckled blue grouper (*Epinephelus cyanopodus*), tiger grouper (*E. fuscoguttatus*), flowery grouper (*E. polyphkadion*), potato cod (*E. tukula*), areolated coral grouper (*Plectropomus areolatus*), leopard coral grouper (*P. leopardus*), black saddled coral grouper (*P. laevis*), lyretail (*Variola albimarginata*) and black fin red snapper<sup>77</sup> (*Lutjanus bohar*). However, the problematic peacock hind (*Cephalopholis argus*) is not listed<sup>78</sup>. Notably, it was found that the trend of total import of certain high-risk species<sup>79</sup> followed the pattern of occurrence of CFP from 1999 to 2005, and there was an increasing trend of occurrence of CFP with an increasing total volume of high-risk species imported (Yeung, 2006).

According to C&SD Trade Statistics, six major susceptible species<sup>80</sup> comprised an average of 3,515 metric tonnes (26.5%) of all imported live marine food fish in 2000-2005. As there is no prohibition on importing fish from ciguatera-prone areas, fish imported from high-risk ciguatera regions can, and still do, enter the market for human consumption typically affecting at least 50 people annually. CFP is confirmed to be an important cause of toxin food poisoning disease in Hong Kong, and it is demonstrated through mouse bioassay analysis that CFP is a significant public health hazard in Hong Kong (Wong et al, 2005).

Moreover, when the fish stock of a particular reef is going to be depleted by over fishing, fishermen will fish in more remote areas and even from high-risk areas. This not only will increase the chance of catching the ciguatoxin-containing reef fish in order to meet demand of the fish exporters, but also will introduce new fish species to the live reef food fish trade (which may be unsuitable for consumption because of high level of ciguatoxin carrier). As a result, there would be an increasing probability of the occurrence of CFP in the future.

Current difficulties in predicting, detecting and treating ciguatera mean that CFP will continue to have large socio-economic impacts (Lewis, 2000). Wong et al (2005) suggested that a reliable and reproducible laboratory test for ciguatoxin is vital for effective screening of coral fish sources as CFP is a significant public health hazard in Hong Kong. Collection of coral fish samples for surveillance of ciguatoxin contamination can detect the importation of ciguatoxin-contaminated fish and identify problematic sources (susceptible species and ciguatera affected areas). In addition, a good surveillance system is beneficial to maintain the economic

---

<sup>77</sup> The FAO common name is two-spot red snapper.

<sup>78</sup> Peacock hind is not in the List of Fishes at Higher Risk of Ciguatera Fish Poisoning (Appendix I) in the Code of Practice; see [http://www.fehd.gov.hk/safefood/library/Ciguatera\\_fish/fish\\_cop\\_e.pdf](http://www.fehd.gov.hk/safefood/library/Ciguatera_fish/fish_cop_e.pdf).

<sup>79</sup> Included giant grouper, high fin grouper, tiger grouper and mangrove snapper

<sup>80</sup> Including leopard coral trout, spotted coral trout, flowery grouper, tiger grouper, high-finned grouper and humphead wrasse.

development of the live reef food fish industry and local tourism, as well as providing baseline information for research on ciguatera in Hong Kong (Wong et al, 2005). Moreover, extensive screening of live reef fish imported into Hong Kong would be one of the better means to detect ciguatoxic fish, although the accuracy of the detection method should be further explored and the cost for detecting ciguatoxic fishes should also be internalized to the fish traders (Yeung, 2006).

It was estimated that about 30 per cent of seafood is traded internationally, in which prevailing problems related to food safety concerns continue (e.g. CFP) (Sadovy, 2000). Sadovy (2000) suggested that the major problem in applying the HACCP guidelines is determining when a hazard is significant and poses an unacceptable risk to the consumer - *does this mean that someone has to die first before the guidelines are rigorously applied?* From this point of view, prevention and control of live food fish is a matter of urgency.

Lewis (2000) suggested four alternative approaches to overcome the difficulties in detecting ciguatera include: (1) bans on the capture or trade of certain species; (2) bans on the capture or trade of fish from certain (high-risk) locations; (3) recommendations to consume small (<50 grams) portions of any one fish; and (4) bans on fish over a certain size (effectiveness not well documented).

### *Preventive measures by other authorities/countries*

According to the FEHD<sup>81</sup>, Hong Kong has taken note of several countries' approach to tackling CFP in coral reef fish, including Japan and Australia. This section summarises the actions of several authorities in regard to preventive measures on CFP.

#### *Australia<sup>82</sup>*

In 2000, the Australian seafood industry began to build an Australia Seafood Standard and decided to do a risk profile as a first step. Exports of live reef fish to Asia and the risk of ciguatera is managed by the Australian Quarantine and Inspection Service (AQIS), while the recreational fishery for which ciguatera is a risk managed by SafeFood Queensland.

According to the AQIS (which applies specifically to exported reef fish), the absolute safety from ciguatera toxicity depends upon total abstinence

---

<sup>81</sup> Ibid as footnote 74.

<sup>82</sup> Personal communication with Mr. Sih-yang Sim, Governance of the Trade and Aquaculture, Australian Government Department of Agriculture, Fisheries and Forestry, (email: [sihyang.sim@daff.gov.au](mailto:sihyang.sim@daff.gov.au)) on 15<sup>th</sup> August 2006.

(from eating risk species). As this is not practicable, control measures introduced by AQIS are intended to reduce the risk as far as is reasonably possible. Current controls recognise two factors: (1) ciguatoxin is a highly regional natural toxin affecting certain piscivorous reef-associated finfish from specific tropical and sub-tropical locations; and (2) the lack of a reliable method for detection of ciguatoxin.; ineffectiveness of organoleptic inspection and randomness of occurrence among fish samples limit the preventive measures available.

As a consequence of these factors, export controls are principally applied prior to the harvest of potentially affected species. The Export Control (Fish and Fish Products) Orders 2005 require that all practical measures (including controls on fish size and location of harvest) for harvesting fish of a species that can be affected by ciguatoxin (being measures necessary to minimise the risk of the harvest and preparation of fish and fish products for export of food being affected by ciguatoxin) must be taken.

### *Canadian Food Inspection Agency (CFIA)*<sup>83</sup>

All importers of fish and fish products into Canada must be licensed with the CFIA. Fish and fish products imported into Canada must meet the same requirements applied to domestically produced fish and fish products for compliance with quality and safety standards. The CFIA, through the Fish Import Inspection Program, monitors imports of fish and fish products by conducting regular inspections. The frequency of inspection, and the specific analyses conducted, are based on the product type, country of origin and the compliance history of the producer.

### *Food and Agriculture Organization of the United Nations (FAO)*<sup>84</sup>

FAO recommends that risk profiling<sup>85</sup> can assist the authority to focus on particular pathogens (including ciguatoxin) and products that are more likely than others to cause serious problems. At the end of the risk profiling exercise the authority will know much about the industry and will be able to make a priority listing of hazards and products that require more complete risk assessment. The profiles also provide a focus for seafood risk managers, showing them the pathogens and products on which they should concentrate. When the risk assessors complete their work and present their estimates, the risk managers use the estimates to regulate (manage) the hazard. Risk managers should interface with all stakeholders in risk communication phases, but in the end it is the managers who must make the regulatory decisions to manage specific risks.

---

<sup>83</sup> See <http://www.inspection.gc.ca/english/fssa/concen/cause/ciguatoe.shtml>.

<sup>84</sup> See <http://www.fao.org/docrep/007/y4722e/y4722e07.htm>.

<sup>85</sup> According to the FAO, risk profiling is defined as *a description of a food safety problem and its context developed for the purpose of identifying those elements of a hazard or risk that are relevant to risk management decisions.*

Since the 1980s, HACCP has become an important part of the food business as a hazard management system. It is a worldwide-recognized systematic and preventive approach that addresses biological, chemical and physical hazards through anticipation and prevention, rather than through end-product inspection and testing. According to FAO<sup>86</sup>, the science based and systematic HACCP system, as it applies to food safety management, uses the approach of controlling critical points in food handling to prevent food safety problems. The HACCP is based on prevention and reduces the reliance on end-product inspection and testing.

The HACCP system can be applied throughout the food chain from the primary producer to the consumer. Besides enhancing food safety, other benefits of applying HACCP include more effective use of resources, savings to the food industry and more timely response to food safety problems.

HACCP enhances the responsibility and degree of control at the level of the food industry. A properly implemented HACCP system leads to greater involvement of food handlers in understanding and ensuring food safety, thus providing them with renewed motivation in their work.

The application of the HACCP system can aid inspection by food control regulatory authorities and promote international trade by increasing buyers' confidence. Notably, any HACCP system should be capable of accommodating change, such as advances in equipment design, changes in processing procedures or technological developments.

### *Secretariat of the Pacific Community (SPC)*<sup>87</sup>

The SPC states that there is a need to take precautions to minimise the risk of getting CFP from eating reef fish because a huge gap of knowledge on ciguatera exists

According to the SPC's *Ciguatera Field Reference Guide*, the SPC suggests the following 8 precautions to minimise the risk of contracting CFP:

1. Avoiding eating fish that have a local reputation for causing CFP. Get advice from fishermen about which fishing grounds are safe;
2. Be careful with large reef fish (i.e. over 10 kg), and avoid them if possible. Whenever feasible, select smaller fish;
3. Gut fish thoroughly. Do not eat the head, eggs, viscera or liver, which are more poisonous than the fillet;

---

<sup>86</sup> See <http://www.fao.org/docrep/W8088E/w8088e05.htm#introduction>.

<sup>87</sup> See <http://www.spc.int/coastfish/Reports/Ciguatera/Ciguatera.htm>.

4. Remember that freezing, cooking, smoking or any other method of preparation or seasoning does not eliminate the ciguatera toxin;
5. Do not rely misleadingly on detection methods (e.g. by flies, ants or coins). The poor cat is in fact more sensitive than humans;
6. After suffering from a case of CFP, avoid eating any kind of fish or other seafood for at least a month and avoid alcoholic drinks;
7. Beware even of areas that have a reputation for being ciguatera free. They can suffer an outbreak of microalgae and become potentially dangerous (the reverse is also true). Also be aware of older fish; and
8. There is no fish poisoning 'season'. Anyone can catch and eat a fish that contains enough toxin to give you food poisoning at any time of the year.

Assessment and management of the risk of CFP will be improved through: (1) better understanding of the ecology of ciguatera, the factors (natural and anthropogenic) responsible for triggering outbreaks, and exposure, dose response and toxicity thresholds for humans; (2) better understanding of ciguatera and its significance at the local level, including information on fish species, periods and fishing areas that pose risks; and (3) effective transmission of this information to as wide an audience as possible so as to raise awareness in the community and bring about changes in personal behaviour. In fact, risk assessment, risk management and communication are inter-related and cannot be disassociated from each other.

Better risk management can be achieved by collection of accurate data on CFP. Health questionnaires filled by a doctor or other health worker, informal interviews with the local population in the Pacific and monitoring of reef areas are the three components of the information-gathering tool. They provide complementary information, giving a fuller picture and understanding of the CFP situation in a given island or country and even in a region so that precautions can be made more efficiently.

### *Singapore<sup>88</sup>*

According to Agri-Food & Veterinary Authority of Singapore, there are no records of ciguatera fish poisoning in Singapore, as a result of eating toxic fish caught in local waters. Since most fish are imported, the volume from local waters is small. Since prior knowledge of potential ciguateric

---

<sup>88</sup> Personal communication with Mrs. Renee Chou, Head of Technology Division, Food Supply & Technology Department, Agri-Food & Veterinary Authority of Singapore (email: Renee\_CHOU@ava.gov.sg) on 1<sup>st</sup> September 2006.

areas and fish remains the best source of caution in avoiding this form of food poisoning, the authority recommends that consumers purchasing tropical marine fish from reef waters should frequent reputable dealers and restaurants. Consumers are also recommended not eat foods prepared from the heads or internal portions of tropical reef fish species.

### *U.S. Food & Drug Administration (FDA) <sup>89</sup>*

According to Chapter 6 (Natural Toxins) of the Fish and Fisheries Products Hazards and Control Guidance of the U.S. FDA's Center for Food Safety & Applied Nutrition, CFP is recognized as a fishpoisoning syndrome in the United States. Ciguatoxin is stated to be carried to humans by contaminated fin fish from the extreme southeastern U.S., Hawaii, and subtropical and tropical areas worldwide. However, FDA does not establish action levels for ciguatoxin. Some states issue advisories regarding reefs that are known to be toxic. In areas where there is no such advisory system, fishermen and processors must depend on first-hand knowledge about the safety of the reefs from which they obtain fish.

The FDA suggests preventive measures for ciguatoxin include ensuring the incoming fish have not been caught in an area for which there is a CFP advisory or for which the authority has knowledge there is a CFP problem, and setting critical limits (e.g. no fish may be harvested from an area that is closed to fishing by local authorities, or an area that is the subject of a CFP advisory, or an area for which is prone to CFP) at the point that if not met the safety of the product will be questionable.

## **SECTION 2      QUESTIONNAIRE SURVEY**

### **2.1      INCEPTION**

To gather public views on the issues relating to existing ordinances covering live food fish trade and food safety considerations, a questionnaire (in Chinese and English) (see Appendix I) was designed on the local live fish trade and food safety in live fish consumption.

In the first half of the questionnaire, the purpose of the study is summarized, background information on the issues of ciguatera and malachite green covered, and existing ordinance on live food fish and the measures currently being proposed by authorities to tackle safety issues in relation to imports of live food fish is provided.

---

<sup>89</sup> See <http://www.cfsan.fda.gov/~comm/haccp4f.html>.

In the second half of the questionnaire, there are seven questions. Each question had 2 options for the respondent to choose, requiring the respondent to make a choice rather than just saying no comment <sup>90</sup>.

The first three questions (Q1, Q2 and Q3) were intended to acquire views on existing legislation and Government control on food and aquatic products. Q4 asked the respondent about the risk of getting ciguatera by listing three main factors. Q5 sought opinion on the purchase and consumption of live food fish according to underlying assumptions. The last two questions (Q6 and Q7) were designed to gather public views on the proposed legislative amendment and its timing for enactment.

## 2.2 SURVEY

Questionnaires were distributed to concern groups <sup>91</sup>, all district councillors, political parties<sup>92</sup>, non-government organisations<sup>93</sup>, green groups<sup>94</sup>, academia<sup>95</sup> and the general public<sup>96</sup> by fax and the Internet from 2<sup>nd</sup> June to mid-July 2006.

Due to the limited budget, a comprehensive telephone survey based on random sampling and conducted by a third party was not feasible for this

---

<sup>90</sup> The respondent could select not to choose either of the options to say "no comment".

<sup>91</sup> Including (in alphabetic order) Aberdeen Fishery & Seafood Merchants Association, Association of Restaurant Managers, Federation of Hong Kong Aquaculture, Federation of Vegetable Marketing Co-operative Societies Limited, Hong Kong Chamber of Seafood Merchant Limited, Hong Kong College of Community Medicine, Hong Kong Doctors Union, Hong Kong Fishermen's Association, Hong Kong Food Council Limited, Hong Kong Food Science & Technology Association Limited, Hong Kong Fresh Fish Merchants Association, Hong Kong Livestock Industry Association, Hong Kong New Territories Fish Culture Association, Hong Kong New Territories Society of Aquariums, Hong Kong Retail Management Association, Hong Kong Suppliers Association Limited, Joint Committee of Hong Kong Fishermen's Organisations, New Territories Chicken Breeders Association Limited and New Territories Fishermen Fraternity Association.

<sup>92</sup> Including (in alphabetic order) April Fifth Action Group, Citizens Party, Civil Force, Democratic Alliance For Betterment of Hong Kong, Democratic Party, Hong Kong Association for Democracy & People's Livelihood, Hong Kong Confederation of Trade Unions, Hong Kong Democratic Foundation, Liberal Party, New Century Forum, The Frontier and The Neighbourhood and Workers Service.

<sup>93</sup> Including (in alphabetic order) Aberdeen Kai-fong Welfare Association Social Service Centre, Eating Establishment Employees General Union, Hong Kong Amateur Fishing Society Limited, Hong Kong Dolphin Watch, Hong Kong Federation of Trade Unions, Hong Kong Professional Teachers' Union, Hong Kong Southern District Women's Association, Hong Kong Women Development Association, New Territories Association of Societies, Southern District Community Concern Association, Synergy Net, Tuen Mun District Women's Association and twenty-one women's associations.

<sup>94</sup> Including Conservancy Association, Friends of the Earth, Green Lantau Association, Green Peng Chau Association, Green Power, Greenpeace China, Hong Kong Bird Watching Society, Hong Kong Dolphin Conservation Society, Kadoorie Farm & Botanic Garden, Ocean Park, Tai Po Environmental Action Group, The Nature Conservancy, TRAFFIC East Asia, World Wide Fund For Nature Hong Kong.

<sup>95</sup> Including the University of Hong Kong (Department of Microbiology and Department of Zoology).

<sup>96</sup> Through the Internet (Civic Exchange's website and public forums managed by 10 websites), emails and contacts of friends.

project. Due to this limitation, possible bias may have been introduced into responses. This issue and its possible implications are addressed in the Section 2.4. .

### 2.3 RESULTS

From 2<sup>nd</sup> June to 26<sup>th</sup> July 2006, 150 completed questionnaires were returned by email, fax, post or hand.

#### **QUESTION 1 (Q1) - Before reading the BACKGROUND, did you realize that live fish is not regarded as food under existing legislation?**

This question was designed to draw the respondent's attention to the issue that live fish is not regarded as food in case the respondent had not read the informative first half of the questionnaire before completing the questionnaire.

Although most people know live fish is edible, 125 of 150 respondents (83.3%) did not know the current legislation does not consider live fish to be a food item in Hong Kong.

#### **QUESTION 2 (Q2) – Are you satisfied with the HKSAR Government in controlling the import, process and sales of food in Hong Kong?**

Sixty-six percent (97 of 147) respondents were not satisfied with the Government in controlling the import, process and sales of food. Three respondents did not answer this question.

#### **QUESTION 3 (Q3) – Are you satisfied with the HKSAR Government in controlling the import, process and sales of aquatic products in Hong Kong?**

111 of 145 (76.6%) respondents<sup>97</sup> were not satisfied with the Government in controlling the import, process and sales of aquatic products in Hong Kong.

Among those 50 respondents who were satisfied with the Government work on food, however, 17 of them<sup>98</sup> (34.0%) were not satisfied with her work over aquatic products.

#### **QUESTION 4 (Q4) – Are you aware of the problem of ciguatera and the relevance of fish size, country of origin and fish type as risk factors?**

---

<sup>97</sup> Five respondents had no comments on Q3.

<sup>98</sup> Among the 50 respondents, 2 had no comments on Q3.

## Legislative Amendment in Hong Kong: Should Live Fish Be Regarded As Food?

---

108 of 150 respondents (72.0%) were aware of the problems of ciguatera and the associated risk factors (fish size, country of origin and fish type).

### **QUESTION 5 (Q5) – Would you buy / eat more live fish if you had confidence that the Government is ensuring safe supplies?**

Assuming the Government can ensure that there is a safe supply of live fish, 106 of 149 respondents<sup>99</sup> stated that they will buy / eat more live fish.

### **QUESTION 6 (Q6) – Do you support the proposed legislative amendment regarding live fish as food?**

Regarding the popularity on supporting the proposed legislative amendment, 145 of 150 respondents (96.7%) agreed that live fish should be regarded as food.

### **QUESTION 7 (Q7) – Do you agree that the enactment of the proposed amendment is a matter of urgency?**

133 of 150 respondents (88.7%) agreed that there is an urgent need to enact the proposed legislative amendment.

## **2.4 EVALUATION OF QUESTIONNAIRE SURVEY**

Despite the relatively small sample size and the potential bias of this questionnaire survey due to non-random sampling, the results provide an indication of public (including representatives from the live fish trade industry) opinion on the issue of safety in live fish in Hong Kong. Since a wide diversity of respondents were approached, we believe that the likely bias due to non-random sample is likely to be slight, if any.

Generally speaking, the majority of Hong Kong citizens do not realize live fish is not regarded as food under existing legislation. In other words, the traditional culture and habit of eating freshly killed fish is not protected by law in Hong Kong and the public is unaware of this. Twenty years ago, having a freshly killed fish served on the dining table was considered to be a luxurious practice. Nowadays, with the advancements in transportation and aquaculture technologies, even an ordinary household can enjoy eating a freshly killed fish at home or restaurant. As a result, there is a need to amend the outdated ordinance in order to ensure the food safety of live fish consumption.

Since people satisfied with the Government control on food were not necessarily also satisfied with the control on aquatic products, there is a

---

<sup>99</sup> One respondent gave no comments on Q5.

need for the HWFB to studying the regulation on fishery products so as to lessen the public concern on the control on aquatic products.

Concerning CFP, Government education, or perhaps newspaper articles, seem to have been to be effective in raising public awareness regarding ciguatoxins. However, the high number of ciguatera cases since 2004 would indicate that the public is still prone to the ciguatoxin and that the Government is not capable of adequately detecting and prohibiting the existence of ciguatoxin-containing fish from sale in local restaurants and markets. As a result, it is not surprising that most people would be more willing to purchase / eat more live fish if its safety could be ensured by the authority.

Regarding the popularity and timing of the enactment of the proposed legislative amendment, the majority of interviewees concurred that live fish should be treated as 'food' and that there is a need to get this amendment gazetted as soon as possible.

### SECTION 3 DISCUSSION

Consumption of freshwater fish (both alive and dead) was over 30,000 tonnes in 2005. Estimated by the AFCD<sup>100</sup>, a total of 123,770 tonnes of marine fish (live, chilled or frozen) was consumed in 2005. Although live marine food fish only comprised 12.7% (by weight) of all fisheries products consumption in 2005, live food fish is considered to be a important to the majority of 7 million Hong Kong people because of their eating culture and the higher value per unit of live fish means that this trade is similar in economic value to the dead fish trade. However, under existing legislation, live fish is not regarded as food such that the trade of live fish cannot be placed under effective regulation and the public receives very limited protection from exposure to ciguatoxic fish. The attempt at a voluntary programme to address this issue, moreover, was unsatisfactory due to the low participation rate of the traders (Yeung, 2006). Perhaps the live food fish industry should have a wider vision (rather than solely making a business) and support the a mandatory, more effective, system for fish imports so as to be more socially responsible for the health care of their customers – the Hong Kong citizens.

Hong Kong is a major consumer of live reef food fish in the Asia-Pacific region (McGilvray and Chan, 2001; Yeung, 2006). There is clearly a need to classify live fish as food and to legislate promptly and appropriately to protect public health interests in Hong Kong. It is clear that the government can act quickly, if necessary, as indicated by the case of

---

<sup>100</sup> Ibid as footnote 30.

malachite green which only required 10 days to gazette and enact an ordinance prohibiting its presence in all food. It is inexcusable that there has been no similar legislation in respect of ciguatoxic fishes, given the hundreds of people affected over the last 17 years. Many other countries, such as like Australia, Canada, Japan and United States as well as other food authorities have addressed this problem, which the Government should tackle this immediately.

As part of the regulation of imports of aquatic products through legislation that addresses food safety issues, the Government would be most effective by setting up a centralized market for all live seafood commodities so that food testing, origin tracing and the quarantine of all imported aquatic products can be conducted upon their arrival in one place, and managed within a one-stop-shop. This has both practical and financial advantages from management of seafood safety perspectives.

According to HWFB<sup>101</sup>, the Government is currently conducting a study on the regulation of fishery and aquatic food products in Hong Kong. The HWFB hopes to submit their plan for a regulatory mechanism to the LegCo and consult with the trade at the end of 2006. As of 10<sup>th</sup> June, the HWFB was still considering the possible scope of the study, which may be subject to modification in the light of findings from the initial study; because it is ongoing information about this study can not be disclosed to the public. We hope our report with recommendations will facilitate ongoing planning.

---

<sup>101</sup> Emails received from the HWFB since 6<sup>th</sup> June 2006.

## **ACKNOWLEDGEMENTS**

Special thanks to Ms. Christine Loh for funding this project, Dr. Yvonne Sadovy for advising on this project, and Dr. Eddy K.F. Lam for his advice on the design of the questionnaire. In addition, I would like to thank the 1823 Citizen's Easy Link, Agriculture and Fisheries Department (especially Ms. Louise W.H. Li and Mr. Rock K.Y. Kwok), Census and Statistics Department (especially Mr. Tom Siu), Department of Health, Food and Environmental Hygiene Department (especially Ms. Catherine T.C. Lai), Health, Welfare and Food Bureau, Hong Kong District Council and Hong Kong Productivity Council for providing figures and information. I would also like to thank Ms. Benita B.Y. Chick, Mr. Fred W.M. Li, Michael W. Shun, Mrs. Renee Chou of the Agri-Food & Veterinary Authority of Singapore, Mr. Sih-yang Sim of the Department of Agriculture, Fisheries and Forestry in Australia, Mr. Being Yeeting of the Secretariat of the Pacific Community, Hong Kong Chamber of Seafood Merchants Limited, Public Health Agency of Canada, South China Diving Club and friends who returned and helped distributing the questionnaires. Finally, I would like to thank Ms. Christine Loh, Dr. Yvonne Sadovy and Ms. Kylie Uebergang for giving invaluable comments in reviewing and editing this report.

**Author:**

Thierry Tak-chuen Chan  
thierrychan@civic-exchange.org

### REFERENCES

- Chan, P.S.W. (2000a) The industry perspective: wholesale and retail marketing aspects of the Hong Kong live reef food fish trade. *SPC Live Reef Fish Information Bulletin*, No. 7, p.3-7.
- Chan, P.S.W. (2000b) Current status of the live reef fish trade based in Hong Kong. *SPC Live Reef Fish Information Bulletin*, No. 7, p.8-9.
- Chan, T.T.C. (2005) *The Current Status and Potential Sustainable Development of the Aquaculture Industry in Hong Kong*, Civic Exchange, 60 pp.. [www.civic-exchange.org](http://www.civic-exchange.org) (under 2005 Publications on Environment and Conservation).
- Halstead, B.W., Auerbach, P.S. and Campbell, D.R. (1990) *A colour atlas of dangerous marine animals*. Wolfe Medical Publications Ltd, W.S. Cowell Ltd, Ipswich, England. 192 p.
- International Marinelife Alliance Hong Kong (IMAHK) (2003) Spreadsheet showing the monthly mean wholesale and retail prices of the common live reef food fish in Hong Kong.
- Lewis, R.J. (2000) Ciguatera management. *SPC Live Reef Fish Information Bulletin*, No. 7, p.11-13.
- McGilvray, F., & Chan, T.C.C. (2001) *The trade in live reef food fish: a Hong Kong perspective*. International Marinelife Alliance. 16pp.
- Pierce, R.H. and Kirkpatrick, G.J. (2001) Innovative techniques for harmful algal toxin analysis. *Environmental Toxicology and Chemistry*, Vol. 20, p.107-114.
- Sadovy, Y. (2000) The Second International Conference and Exhibition on the Marketing and Shipping of Live Aquatic Products '99. *SPC Live Reef Fish Information Bulletin*, No. 7, p.10.
- Sadovy, Y. and Mantel, S.K. (2006, in press) Hong Kong's Fish Consumption Driving Species to Extinction: Role for Better Consumer Education for Consumption and Conservation. Press Release on 30<sup>th</sup> May 2006, The University of Hong Kong. ([http://www.hku.hk/press/news\\_detail\\_5391.html](http://www.hku.hk/press/news_detail_5391.html))
- Willmott, E. (2000) *A Comprehensive Review of Marine Policy in Hong Kong*. Civic Exchange, Hong Kong. 28pp.
- Wong, C.K., Hung, P., Lee, K.L.H. and Kam, K.M. (2005) Study of an outbreak of ciguatera fish poisoning in Hong Kong. *Toxicon*, Vol. 46, p.563-571.
- Wong, P.S. (1995) Country Reports : Hong Kong. *In : Regional Study and Workshop on the Environmental Assessment and Management of Aquaculture Development* (ed. FAO/NACA) NACA Environment and Aquaculture Development Series No. 1. Network of Aquaculture Centres in Asia and Pacific, Bangkok, Thailand. Annex II-4, p. 113-139.
- Yeung, L.K. (2006) Review of food safety policy in Hong Kong: Challenges facing the safe consumption of live reed fish. A dissertation of the Environment Management MSc Degree (Envm 9004) presented to the University of Hong Kong, 103pp.

## TABLES

---

**Table 1 Estimated quantity (in metric tonnes) and monetary value (in HK\$ million) of live freshwater and marine fish imported into Hong Kong from 2000 to 2005**

Year	Freshwater		Marine	
	Tonnes	HK\$ Mn	Tonnes	HK\$ Mn
2000	39,816	513	15,102	1,093
2001	41,783	512	16,325	1,487
2002	47,655	522	13,653	1,272
2003	34,647	357	13,621	1,022
2004	38,873	338	15,921	1,082
2005	29,274	295	15,708	973

**Source: Agriculture, Fisheries and Conservation Department (AFCD), and Census and Statistics Department (C&SD)**

Note:

1. The figures shown exclude aquarium fish and fish fry.
2. The figures shown are collated from the annual consolidated C&SD and AFCD data.

## TABLES

**Table 2 Estimated quantity (in metric tonnes) and monetary value (in HK\$ million) of different kinds of live freshwater fish imported into Hong Kong from 2000 to 2005**

Species	2000	2001	2002	2003	2004	2005
Trout	N/A	990	N/A	N/A	609	N/A
Eels	1,322,299	1,588,946	1,841,961	2,049,499	1,557,600	1,663,156
Grass carp	12,201,101	12,212,346	16,085,146	7,717,469	5,731,478	5,223,509
Big-head	6,134,611	6,805,179	7,601,887	3,373,055	3,587,853	3,230,514
Other carps	3,533,927	2,744,005	2,812,160	935,583	1,392,237	378,254
Snooks and basses	2,010,754	1,749,513	1,217,382	1,274,780	1,527,699	1,998,347
Other fish	14,613,693	16,681,757	18,096,641	19,296,462	25,075,695	16,779,777
<b>Total</b>	<b>39,816,385</b>	<b>41,782,736</b>	<b>47,655,177</b>	<b>34,646,848</b>	<b>38,873,171</b>	<b>29,273,557</b>
Declared value (HK\$ million)	513	512	522	357	338	295

**Source: Census and Statistics Department (C&SD)**

Note:

1. "N/A" means "not available".
2. Other carps means carps other than grass carp and big-head.

## TABLES

**Table 3 Estimated quantity (in kg) of different kinds of live marine fish imported into Hong Kong from 2000 to 2005**

Species	2000	2001	2002	2003	2004	2005
Leopard coral trout*	2,649,263	2,301,554	2,468,726	2,337,101	2,452,218	2,501,500
Flowery grouper*	265,695	324,658	344,431	250,814	366,649	421,131
Spotted coral trout*	202,374	256,589	317,837	199,803	104,260	107,512
Tiger grouper*	172,014	343,408	418,297	488,488	588,142	781,421
Humphead wrasse*	81,572	36,952	48,673	46,401	33,471	60,648
High-finned grouper*	14,969	18,135	26,374	8,760	27,191	25,190
<b><i>Sub-total of ciguatera susceptible species*</i></b>	<b>3,385,887</b>	<b>3,281,296</b>	<b>3,624,338</b>	<b>3,331,367</b>	<b>3,571,931</b>	<b>3,897,402</b>
<i>Percentage of TOTAL</i>	22.4%	27.2%	30.4%	27.5%	26.8%	24.8%
Green grouper	3,702,581	1,763,506	1,500,925	2,169,574	1,939,592	1,461,300
Mangrove snapper	613,752	494,838	238,619	91,982	185,150	324,443
Giant grouper	23,894	27,605	31,707	62,460	87,447	94,085
Other groupers	2,226,945	2,283,640	1,716,752	1,516,834	1,438,046	1,910,393
Other wrasses & parrotfish	109,160	70,538	102,856	49,635	14,572	11,153
Other marine fish	5,037,069	4,163,289	4,689,351	4,899,884	6,069,041	8,009,901
<b><i>Sub-total of "safe" species</i></b>	<b>11,713,401</b>	<b>8,803,416</b>	<b>8,280,210</b>	<b>8,790,369</b>	<b>9,733,848</b>	<b>11,811,275</b>
<b>Grand TOTAL</b>	<b>15,099,288</b>	<b>12,084,712</b>	<b>11,904,548</b>	<b>12,121,736</b>	<b>13,305,779</b>	<b>15,708,677</b>

**Source: Agriculture, Fisheries and Conservation Department, and Census and Statistics Department (C&SD)**

**Notes:**

1. Fish are imported by sea, road, air, river, fishing vessels and others mode of transport.
2. Import figures from fishing vessels are estimated from information provided voluntarily by ten major fish traders transporting/collecting/fishing live marine fish into Hong Kong. It is estimated that the import volume of these traders constituted about half of the total volume of live marine fish imported into Hong Kong by fishing vessels.
3. Other groupers includes yellow-edged lyretail\*, speckled blue grouper\*, red grouper, brown-spotted grouper, yellow grouper, slender grouper, malabar grouper, roving spotted grouper, bared cheek spotted grouper, blackfin grouper, etc.
4. Other wrasses include green wrasse, blue stripe parrot fish, etc.
5. Other marine fish includes moray eels\*, lentjan, stone fish, red snapper, white blotched snapper, rabbit fish, pampano, gold-lined seabream, russell's snapper, waigen perch, seabass, etc.
6. An asterisk "\*" denotes the FEHD declared susceptible common coral reef fish species containing ciguatoxin.

## TABLES

---

**Table 4 Number of ciguatera fish poisoning cases and people affected in Hong Kong from 2000 to 2006 (till 30<sup>th</sup> May 2006)**

Year	Number of cases	Number of people affected
2000	32	86
2001	20	62
2002	18	60
2003	6	27
2004	64	242
2005	43	127
2006	11	36

**Source: Department of Health**

# APPENDIX

---

## APPENDIX I

Questionnaire (English version)

## Questionnaire on the Proposed Legislative Amendment in Hong Kong: *Should live fish be regarded as food?*

**In addition to reviewing existing ordinances related to live food fish and exploring the issue of the safety in live fish consumption in Hong Kong, the independent think tank Civic Exchange has launched a public survey on live fish food safety in Hong Kong. By August 2006, we aim to report on recommendations for policy-makers to determine the best solution on protecting the health of citizens.**

### BACKGROUND

From 2000 to March 2004, there were 100 cases of ciguatera poisoning, involving 333 citizens who consumed live reef food fish. Last year, the ‘sudden’ discovery of malachite green in live fish (esp. for freshwater fish) raised public awareness on the safety of live food fish consumption.

However, under existing laws (under Cap 132 Public Health and Municipal Services Ordinance), **“animal” does not include “fish” and “food” does not include “live fish”**. This means that live food fish is not considered to be a food item in Hong Kong and that the government is limited in its ability to protect the public from contaminated live fish. Although live fish can be deemed as food for *“provision for the prohibition, restriction or regulation of the sale, or possession, offer or exposure for sale or consignment or delivery for sale in the interests of public health or for the protection of the public”* (under Section 57), the authority has never confiscated any live fish. To lessen public concern, the Government amended Cap 132AF Schedule 1, such that any food (including live fish) containing malachite green is prohibited from import and sale. Following on from the recent appointment of the Controller of the Centre of Food Safety (CFS), the CFS advised it will submit a draft proposal on the control of the imports of live fish to the Legco by the end of 2006. Civic Exchange aims to provide research on issues concerning live fish trade including the existing ordinances covering this trade, safety considerations and public opinion on these matters.

### QUESTIONS (Please put a in the box provided)

1. Before reading the BACKGROUND, did you realize live fish is not regarded as food under existing legislation?       Yes       No
2. Are you satisfied with the HKSAR Government in controlling the import, process and sales of food in Hong Kong?      Yes       No
3. Are you satisfied with the HKSAR Government in controlling the import, process and sales of aquatic products in Hong Kong?       Yes       No
4. Are you aware of the problem of ciguatera and the relevance of fish size, country of origin and fish type as risk factors?       Yes       No
5. Would you buy / eat more fish if you had confidence that the Government is ensuring safe supplies?       Yes       No
6. Do you support the proposed legislative amendment regarding live fish as food?       Yes       No
7. Do you agree that the enactment of the proposed amendment is a matter of urgency?       Yes       No

**Please fill in your personal details if you want to receive the report of this study.**

**Name:** \_\_\_\_\_ **Occupation:** \_\_\_\_\_ **Organization:** \_\_\_\_\_  
**Telephone:** \_\_\_\_\_ **Email:** \_\_\_\_\_

# APPENDIX

---

## APPENDIX II

Questionnaire (Chinese version)

## 建議修訂法例之問卷調查：活魚應否定為食物？

獨立智囊組織思匯政策研究所，現正審閱香港現存有關食用活魚的法例、探討活魚的食物安全問題，以及展開一項公眾對活魚食物安全的問卷調查。我們將於 2006 年 8 月向制定政策人士，提交一份建議書，以保障市民的健康。

### 背景

因進食活珊瑚魚所引起的雪卡毒個案於 2000 至 2004 年，香港就有一百宗、共涉及三百三十三名市民。去年，孔雀石綠「突然」在活魚（尤其是淡水魚）中發現，令公眾關注到食用活魚的安全性。

然而，根據香港現行法例（第 132 章《公眾衛生及市政條例》），“動物”不包括“魚”，而“食物”則不包括“活魚”，即表示用來食用的活魚並不被視為食物，從而限制了政府保障市民避免食用含毒性活魚的能力。然而，就公眾衛生利益所需或保障公眾的情況下，法例條文可禁止、限制或規管將活的家禽、活的爬蟲及活魚出售或要約出售，或為將該等活的家禽、活的爬蟲及活魚出售而將其管有或展出或託付他人或交付他人，其方式猶如該等活的家禽、活的爬蟲及活魚是食物一樣（第 57 條），當局卻從來沒有充公任何活魚。為了舒緩公眾對孔雀石綠的關注，政府修改了第 132AF 章的附表 1，禁止輸入和出售任何含有孔雀石綠的食物（包括活魚）。隨着政府正式委任食物安全專員，食物安全中心宣佈將於 2006 年底向立法會提交一份用以管制活魚入口的建議書。思匯旨於就活魚貿易（包括涉及該貿易的現存法例、食物安全及公眾的意見）進行是項研究。

### 問題（請在空格內加上√號）：

1. 在閱讀上述背景前，閣下是否知道香港現行法例並不視活魚為食物？  知道  不知道
2. 閣下是否滿意香港特區政府在監管本港食物的輸入、加工及銷售工作？  
 滿意  不滿意
3. 閣下是否滿意香港特區政府在監管本港水產品的輸入、加工及銷售工作？  
 滿意  不滿意
4. 閣下知不知道中雪卡毒的風險，是與魚的大小、來源地，以及魚類品種有關？  
 知道  不知道
5. 倘若政府保證安全食用的魚類供應，閣下會否購買或進食更多魚呢？  會  不會
6. 閣下會否支持有關把活魚定為食物的法例修訂建議嗎？  支持  不支持
7. 閣下是否同意實施所建議的修訂法例是有逼切性呢？  同意  不同意

---

如果閣下希望收到本研究項目之報告書，請填寫下列的個人資料。

姓名：\_\_\_\_\_ 職業：\_\_\_\_\_ 所屬組織：\_\_\_\_\_

聯絡電話：\_\_\_\_\_ 電郵地址：\_\_\_\_\_

香港中環雲咸街 69 號賀善尼大廈 701 室

電話：(852) 2893-0213 傳真：(852) 3105 9713 電郵：thierrychan@civic-exchange.org