More information about the Big Fish Count and on butterflyfishes is available from http://www.wwf.hk.org and http://www.fishbase.org, respectively.

Some insights from Taiwanese fisheries

by Kenny Leung

I was very glad to attend a training workshop on "Modern Fisheries, Aquaculture and Seafood Processing" at National Taiwan Ocean University (NTOU) in Taiwan during early July 2005. It was co-organised by the Joint Committee of Hong Kong Fisher's Association and the Agriculture, Fisheries and Conservation Department of Hong Kong SAR. During the workshop, we attended 3 days of intensive lectures at NTOU located in Keelung and then spent 3 days visiting different fisheries organisations and ports, aquaculture facilities as well as seafood processing plants in Taiwan. We travelled from the north to south of Taiwan, passing through Taipei, Suao, Hualian, Kaohsiung etc. Here, I would like to share some of my experiences and photos taken from this trip with readers of *Porcupine!*

In total, there are 300,000 fishermen in Taiwan and at least 1,000 vessels over 100 tonnes. According to the President of Overseas Fisheries Development Council of The Republic of China, Mr. Peter Ho, fisheries production contributed NT $ 97 billion or 0.54% of GDP in Taiwan in 2003 (equivalent to 1.5 million metric tonnes). Obviously, the scale of Taiwanese fisheries is many times greater than that in Hong Kong. However, like Hong Kong and other parts of the world, Taiwan is also facing problems associated with a significant drop in available fisheries resources, especially in coastal and offshore areas. Many traditional coastal fishermen cannot make ends meet and some can no longer fish. To resolve these problems, since 1980s the Government and fisheries organisations have been making huge efforts to transform the entire fishery industry. The components of such transformations include the development of distant water fisheries, establishment of eco-tourism (e.g. dolphin and whale watch, diving), deployment of artificial reefs for both conservation and eco-tourism (i.e. diving business), enhancement of aquaculture yield and improvement of marketing seafood products as well as implementation of fishing moratorium incentive schemes (Fig. 1). Based on my observations, Taiwanese fishermen are very united and well organised, and many of them are well educated, i.e. university graduates. These transformations create many job opportunities and improve the living standards of people within the fishery community. But it is not clear whether the fisheries are improving.

Taiwan has been heavily subsidising the fishery industries. Due to the significant decline in coastal and offshore fisheries, the government has been promoting and helping the development of distant water fishing. So far, there are 30 advanced vessels in Taiwan (like the one shown in Fig. 2) which can be operated in deep-waters for catching high value

Fig 1. An official poster announcing the fishing moratorium incentive schemes. There are two schemes:

(1) Voluntary no-fishing – active coastal and offshore vessels must stop fishing and park at the port for at least 120 and 100 days, respectively. The period of 'no fishing' can be freely selected between 1 May and 31 October each year.
(2) Official moratorium – all vessels must follow the suggested period given by the fisheries organisation and park their vessels at the port for at least 60 days.

fish such as tunas. Each of these vessels costs three billion NT dollars (= HK $0.7 billion); fishermen can't afford this without the support from the government and private investors. In 2003, distant water fisheries contributed 58.5% of total fisheries production in Taiwan, whereas coastal fisheries only accounted for 4.2%. Nonetheless, I am concerned that many tunas, swordfish, sharks, tooth (or oily) fish, moonfish and sunfish have already been seriously over-exploited by such powerful fishing vessels. As I believe that pictures can speak better themselves, I have selected some photos (Fig. 3-11) to show some of these species (I must confess that I am not a good photographer). Although Taiwanese fishermen must follow the international quota system, the FAO Code of Conduct for Responsible Fishing [1] and international plans of action, the current trend of increasing effort in distant water fisheries will certainly do more harm to such fragile ocean ecosystems because many of these oceanic species grow slowly, reach sexual maturity at old age and have low reproduction rates. From discussions with fishermen and lecturers at NTOU and from the catch data, it is clear that even with increasing fishing effort, the yield of some key species such as blue-fin tuna *Thunnus thynnus*, and albacore tuna *T. alalunga* have declined

substantially and fishermen have switched to catch more bigeye tuna *T. obesus* and yellow-fin tuna *T. albacares* which will be eventually depleted as well. We do need to ask what is the sustainable harvest rate or yield in the ocean?

Fig. 2. Example of an advanced fishing vessel used for distant water fisheries with a 1.2 km long purse seine that can cover an area of 400 m^2. It is equipped with a helicopter that can facilitate searching for tuna, and with a deep freezer to preserve the tuna at < -60°C.

Different sizes of vessels will be awarded with different amounts of money from the Government to compensate their loss during the moratorium. For example, vessels of 60-70 tonnes will be paid NT $30,000 for option (1) or NT $ 133,000 per 60 days for option (2). The schemes are incentive-driven and very flexible when compared with the one in P.R. China.

Fig. 3. Price negotiation between fishermen and buyers on the blue-fin tunas *Thunnus thynnus*. This was an exciting event in the port with many people watching and engaging in the negotiation.

Fig. 4. Tens of yellow-fin tunas *Thunnus albacares* were displayed awaiting deals between the seller and buyer.

Fig. 5. Vessels using long-lines or long purse seines often catch many different fish species including sunfish, moonfish and many different shark species.

Let's talk about the bright side. I was delighted to see that some fisheries organisations have incorporated 'green education' in their eco-tours. During our visit, the word 'sustainability' has been mentioned many times by the presidents, directors, managers and fishermen in various fishery organisations, indicating that they do understand that marine resources are limited, and will be seriously depleted without proper management and enforcement. At least, it

sounds optimistic and environmentally friendly. I hope they will achieve 'sustainable fisheries' through practice.

Fig. 6. Toothfish (or oily fish), *Dissostichus* species are also common in the offshore and distant water catches of Taiwanese fishermen.

Fig. 7. Hundreds of various sizes of swordfish with their sword removed. Many of them were over two meters in length.

Fig. 8. Dorado fish, *Coryphaena hippurus*, are commonly caught by vessels using long-lines.

Fig. 10. Taiwanese fishermen argue that they never conduct 'finning practices' on sharks and that Taiwanese use every single part of the shark for consumption. They also believe that many shark stocks are still very healthy and that no quota should be implemented for sharks. But, as you can see this picture, just a tip of an iceberg, thousands of sharks are killed everyday.

Fig. 9. Many fishes, such as sharks and sunfish, are dissected onboard and their muscle and internal organs separately frozen. The same method can be used to process whale sharks to evade the quota monitoring system.

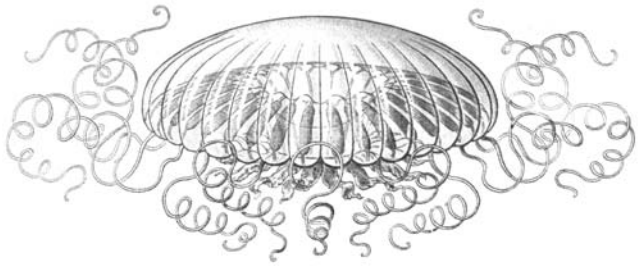
Fig. 11. Every single bit of the shark fin is removed and processed immediately after landing. There is a huge demand for shark fins regardless of the shark species, or their size, throughout SE Asia.

Bibiography

[1] http://www.fao.org/fi/agreem/codecond/ficonde.asp

[2] http://www.afcd.gov.hk/fisheries/eng/capture.htm

Epilogue: on the one hand, ecologists and conservationists would like to see reduction in fishing efforts, and stock recovery; on the other, governments have to consider the social side and living conditions of fishermen by allowing and facilitating them to fish more. It seems a true dilemma in fisheries management. As we all know, the fishery industry in Hong Kong is somewhat getting close to its 'sunset'. In 2004, there were only 9,500 fishermen (0.14% of 6.7 million of people) in Hong Kong [2]. In my opinion, our fishermen are less united and not as well-organised as Taiwanese fishermen; hence any transformation of the industry is rather difficult. Although our Government has been supporting and subsidising the fishermen for many years, our fishery development is still far behind counterparts like Taiwan. In Hong Kong, it is a bit late to develop distant water fisheries. So far, there is only one company directly engaged in distant water fishing. Building advanced vessels will require a large amount of money (@ billions $) while the operators must be well-educated in both ocean science and engineering. Probably, it is not a viable option for the traditional fishermen in Hong Kong. What is the way forward for our fishermen? This is an important but a difficult question for the Government, fishermen, politicians and academics. The Taiwanese model may offer us some useful insights.



SWIMS tidings....

It has been a very busy time at SWIMS since the last *Porcupine!* hit the press. In March we had the pleasure of a visit by Sir John Swire. Sir John was the driving influence at the Swire Group behind the establishment of SWIMS and officiated at both the opening ceremonies of the Swire Marine Laboratory in 1990 and of the Swire Institute of Marine Science in 1994. It was therefore a great pleasure to show Sir John around the renovated facilities and to update him on SWIMS development and future directions. Sir John, and his brother Sir Adrian, always make the effort to visit SWIMS and chat with staff and students when they are in Hong Kong reaffirming their support and commitment to SWIMS.

SWIMS has been a pretty full house over the summer – with student Research Assistants helping projects at Hoi Ha Wan and on fish larval surveys, as well as the normal variety of student projects. We are extremely grateful to all the cheerful volunteers, too numerous to mention, who populated SWIMS in the summer. We also had our fair share of student visitors, including Tilly Thoreson and Tom Gallagher (Bangor University UK) who joined Olivia Stark (Oldendorf, Germany). Olivia has been working at SWIMS for the last year on the impacts of fishing on sea urchin populations. We also welcomed visiting scientists, including Dr Giacomo Santini (Firenze University Italy) who worked with Avis Ngan on limpet behavioural modeling and Ryan Hechinger (University of California Santa Barbara, USA) who investigated parasites in mud snails. Dr Santini gave a seminar at SWIMS, as did Prof Mike Kingsford (James Cook University, Australia).

The most recent SWIMS event was a special Symposium on the Physiology of Marine Organisms (SEMO) attended by over 60 delegates and held in September. The ecophysiology of marine organisms is a research area that which we are developing at SWIMS and this symposium attracted speakers from all major tertiary institutions in Hong Kong, as well as colleagues from the UK, Italy and Brunei. The talks were very well received and achieved their aim of stimulating collaboration and links among participants. Following the Symposium, Drs David Morritt (London University, UK) and Maui de Pirro (Firenze, Italy) stayed on to work on the impact of summer monsoons on intertidal organisms with staff at SWIMS.

Finally – congratulations to ex-SWIMS colleagues Dr Andy Cornish, who has recently become the Director of Conservation at World Wide Fund for Nature HK, and Dr Benny Chan recently appointed as an Assistant Professor at the Research Centre for Biodiversity, Academia Sinica, in Taiwan – we look forward to collaborating with both Andy and Benny in the future!

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